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THE UNIVERSITY OF ALBERTA

SOME GEOGRAPHICAL ASPECTS OF DAIRYING IN ALBERTA

BY

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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled Some Geographical Aspects of Dairying in Alberta, submitted by Austin A. Lupton in partial fulfilment of the requirements for the degree of Master of Arts.

ABSTRACT

Agricultural surveys of the Canadian west rarely stress that farmers on the prairies contributed over a fifth of Canada's total milk production in 1961. A major portion of this output comes from numerous mixed farms which are located on extensive tracts of some of the most fertile soils in Canada. The fact that the manufacture of butter is in excess of provincial needs is also often missed. Nevertheless farmers in this province traditionally have supplied butter to the British Columbia market. Milk production for fluid sales is increasing in importance because urban populations have been growing rapidly in Alberta since the second world war. Correspondingly, dairying adjacent to these domestic markets is shifting from a secondary operation to a more commercial one.

The tempo of agricultural specialization is intensifying and dairying too, is coming to be a better managed segment of the farm economy in this province. The pressures leading to this development are, to a large degree, of a commercial nature although provincial policies are equally important in limited areas.

The geographical location of mixed farming and dairying is linked to many variables, among which may be cited economic demand, the physical environment and availability of transportation. Overt manifestations of cultural differences in Alberta, as far as dairying is concerned, appear to be minimal

although the ethnic origin of the farmers is diverse. Agricultural specialization seems correlated with the generalized climatic and resultant soil zones. Hence these generalized soil zones have been employed as one of the bases for an areal differentiation of the characteristics associated with dairying throughout the province.

A discussion of the two major milksheds in Alberta has been included because they provide an opportunity to study specialized dairying and the forces affecting its location in greater detail.

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INTRODUCTION

PURPOSE AND OBJECTIVES

This thesis has been undertaken with the intention of examining the trends of dairy farming and determining the character and relative importance of dairying throughout Alberta, with special emphasis on dairying in the major soil zones. These trends and patterns are described and then discussed with reference to physical, economic, and political variables.

Dairying is not evenly distributed throughout the province of Alberta; rather, there are specific areas of concentration in which local market or physical conditions make it feasible. In the first case dairying is highly profitable and takes place in spite of the local physical geography because proximity to market is an overriding factor in the production of a bulky, perishable product. In the second instance, dairying ranges from a significant part of a crop-livestock economy to a last resort for farmers who are still engaged in clearing the bulk of their land or who are operating under physical conditions which limit the long term production of all but a few fodder crops.

Dairying is not an extremely important aspect of Alberta's farm economy in terms of the proportion that it contributes to total farm income. For example, dairying in Alberta contributed 7.4 per cent of the total gross agricultural income in 1961 and the most it has ever contributed to farm

income is 11.7 per cent in 1931. Dairying however, is important in other less obvious ways: it is complementary to beef, veal and hog production; it provides a fairly predictable source of income which is earned throughout the year, rather than received in a lump sum at the end of a particular season; it adds stability to the mixed farming economy in periods of crop failure or economic setback; and lastly, the manufacture of dairy products on a provincial scale helps to keep small urban centres economically viable and provides needed employment for under-employed farm personnel.

Although dairying receives a great deal of attention from the provincial government and the local dairymen's associations, few attempts have been made to describe its location or how its character varies from place to place. This kind of survey must be executed before certain specialized aspects of the industry can be examined. It is with the aim of partially fulfilling this need that this thesis has been undertaken. Needless to say, a geographer, because of his training, is particularly concerned with these aspects of the industry.

PROCEDURE

Many of the data for this study have been gathered from field work, personal interviews, and mailed questionnaires. One hundred and twenty dairy plant managers, the heads and other personnel of various provincial departments, and numerous farmers and provincial district agriculturists were interviewed during the summer of 1963. This study was made possible

through the courtesy of the Alberta Department of Agriculture, the Board of Public Utilities, and an intersessional bursary awarded by the University of Alberta.

Mr. R. S. Ellis, Chief, Agricultural Section, Census Division, Dominion Bureau of Statistics, provided census materials for areas much smaller than the normal reporting census units. This enabled the author to construct fairly accurate dot maps depicting the distribution of dairy cattle and dairy farms and furthermore these distributions could be correlated more precisely with edaphic, climatic, and market characteristics. All of the foregoing data were placed in historical perspective and related to pertinent physical and cultural elements to provide a comprehensive survey of dairying. The task was not particularly easy because numerous elements, both singly and in combination, have contributed to the present character and distribution of the dairy industry of Alberta.

CHAPTER I

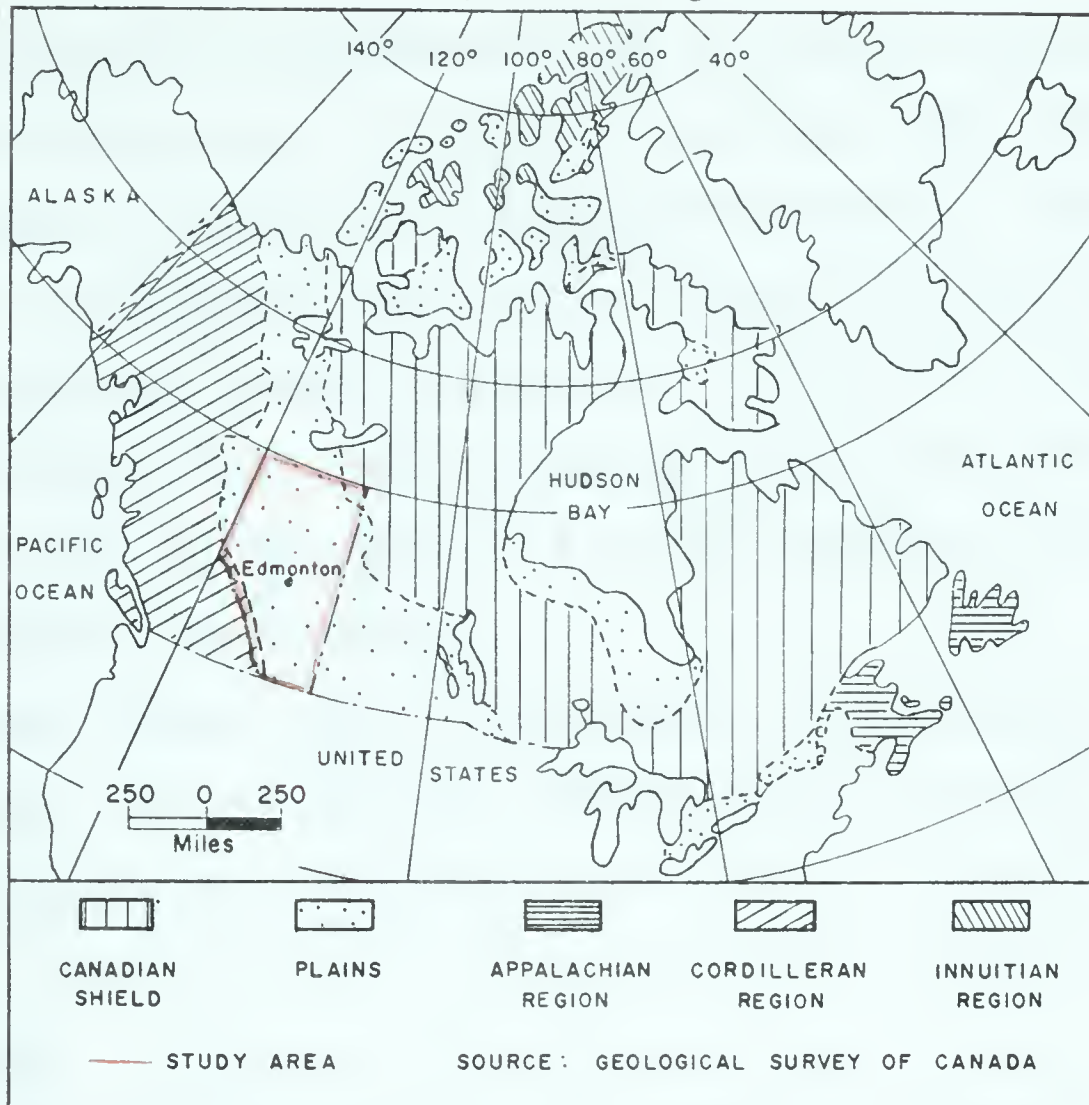
PHYSICAL BACKGROUND AND REGIONAL VARIATIONS IN FARMING AND DAIRYING

PHYSICAL GEOGRAPHY

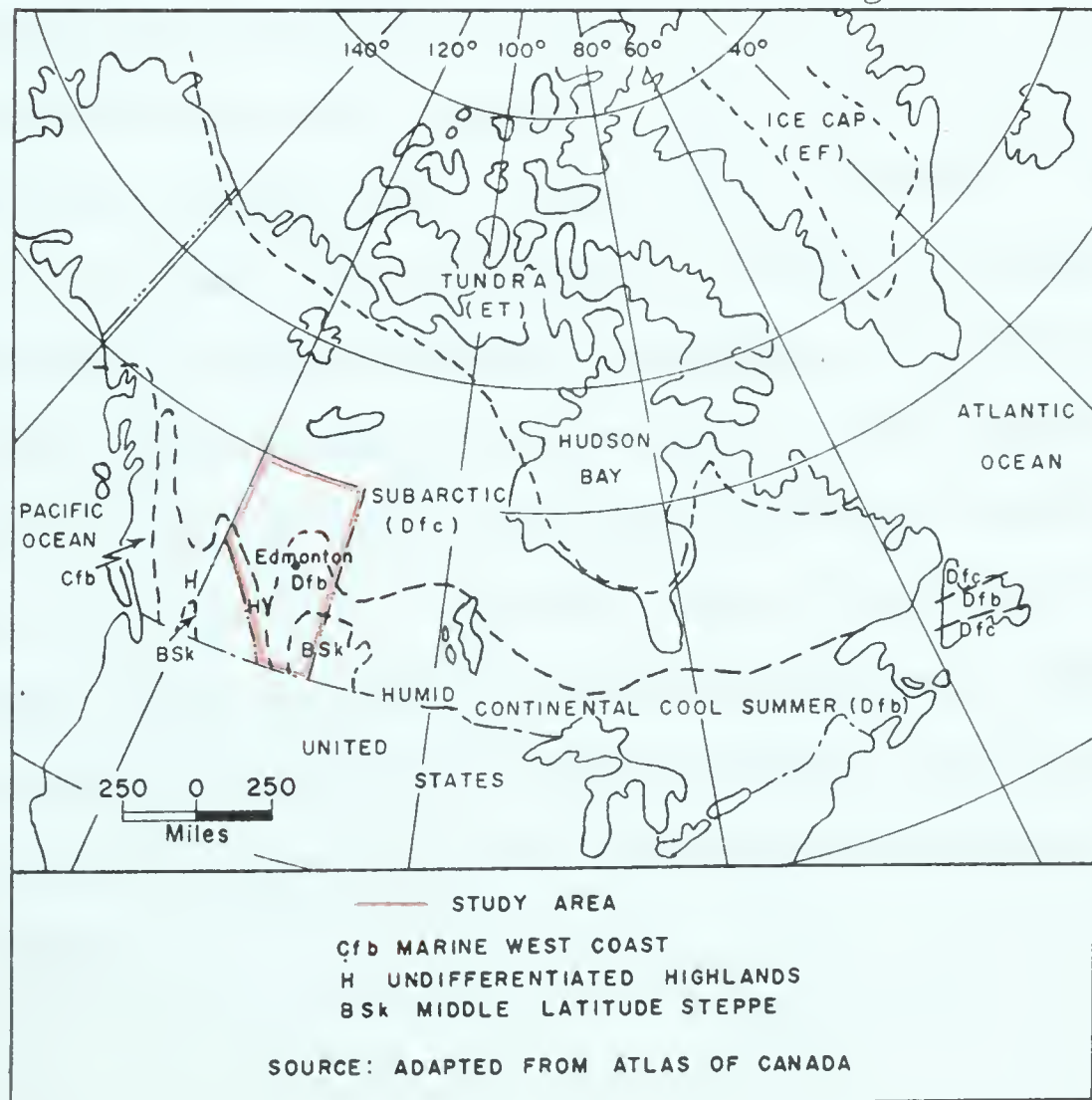
Physiography

Alberta is the westernmost prairie province, located between 49° and 60° north latitude and between 110° and 120° west longitude in the north and 110° and 115° west longitude in the south. Almost the entire area of this province lies within the plains physiographic region; the Canadian shield and the Cordilleran region occupy a small part of the northeast corner and the southwest side respectively (Map 1a). Relatively young, poorly consolidated sedimentary rock composed largely of Cretaceous and Tertiary shale, sandstone, and conglomerates overlaying older sedimentary strata belonging to the Palaeozoic era is the major constituent of the plains region. The parent material for these rocks was derived for the most part from sediments deposited on the bed of a shallow sea which had invaded the heart of North America several times, although some rocks were formed from continental deposits. When the sea retreated in the Cenozoic era a fairly flat plain remained which sloped toward the east in the southern and central parts of the province and to the north in northern Alberta. The western edge of the platform has been gradually warped upwards with the building of the Rocky Mountains late in the

Map 1 A Physical Regions



Map 1 B Generalized Climatic Regions



Cretaceous period of the Mesozoic and during the Tertiary period of the Cenozoic era. The entire area has been subjected to several stages of uplift and consequently also to subaerial erosion for the greater part of its history, but the evidence for these geologic events is partially obscured by glacial deposits which were laid down during the Pleistocene period by continental and alpine glaciers from the Keewatin centre and Rocky Mountains respectively.

The most recent major erosive agent is running water which seemingly has not yet been too effective because many of the glacial deposits are still quite distinct and fresh in appearance.

Climate

Two important features of the geographic location of Alberta profoundly affect the climate of this area: first, the northerly position of the province, and, second, its continental position in the lee of the Rocky Mountains. This latter feature has made the continental climate in Alberta much more arid than it might normally be because the westerly winds bringing the rain-bearing maritime Pacific air masses have lost much of their moisture through orographic uplift by the time they reach Alberta. Although the province receives, on the average, small amounts of precipitation when compared with the west coast of Canada or southern Ontario, it is quite effective for agriculture because the bulk of it falls in the growing season.

There is a latitudinal zonation of climatic types within the province which are classified by the Koeppen system (Map 1b), from north to south, as: subarctic, humid continental cool summer, middle latitude steppe and along the western boundary the undifferentiated highland climate of the Rocky Mountains. These climatic types indicate that the mean temperature increases generally from north to south while both the actual and effective precipitation decreases. The middle latitude steppe climatic zone is especially noted for its aridity because potential evapotranspiration exceeds actual evapotranspiration resulting in drought conditions for most kinds of vegetation. Farther north, in the humid continental cool summer climatic zone, drought is less likely because, not only is precipitation greater, but it is also more effective because the average temperature is lower. This favorable condition is offset by a slightly shorter growing season and a greater likelihood of frost during the growing period.¹

GENERAL CHARACTERISTICS OF FARMS IN CANADA

The following comparison of farming and dairying throughout Canada and within the prairie provinces is of value because it places the study in context and indicates the importance of dairying in Alberta in a relative and absolute sense.

One of the most apparent conclusions of a general analysis of Canadian farms as shown in Table I, is that productivity

1. The effects of rainfall, drought and frost on agriculture are discussed in greater detail in Chapter IV.

Table I All Census Farms - Average Size, Labour Expended and Gross Income - 1961

Region	Farm Size in acres	Popula- tion per farm	Total Weeks of Labour Expended per Farm	Income in Dollars per acre	Gross Income Per farm
Canada	359	4.5	23.1	12.5	4500
Maritimes	161	5.0	23.2	15.0	2410
Eastern Canada*	151	5.1	28.0	30.5	4605
Prairies	614	3.6	17.5	7.6	4660
West Coast**	226	4.3	32.0	19.0	4300

Source: Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.

Canada. Dept. of Agriculture, Economics Division,
Current Review of Agricultural Conditions in Canada,
Vol. 24, No. 1, January 1963.

* Ontario and Quebec

** British Columbia.

per acre varies from region to region. Prairie farms appear enormous in areal extent when compared with those of Ontario and Quebec. In one sense, however, they are the same size, because although the farms differed in area in 1961 they yielded roughly the same total gross income (see Table 1). Income per acre in the east was over four times as high as in the west so that the farmer with a 151 acre agricultural enterprise in Ontario or Quebec received, on the average, 4,605 dollars of gross income; the same gross income received by the average prairie farmer with a farm 614 acres in extent. This kind of comparison of the productivity of farms is not valid for all

years because prairie agricultural income varies markedly in response to climatic setbacks or fluctuation in international demand for farm products. Nevertheless the relative position of each region of Canada, as shown in Table I, does not fluctuate over the long term. This comparison is not valid for all of Canada in 1961 either unless both the percentage of the total farm area actually used for agriculture and the number of part-time farmers is considered. Gross income per farm for the Maritimes, for example, is much lower than in any other part of Canada because only 38 per cent of the total farm area is improved and because a large number of the farms are really only part-time operations.² Thirty-eight percent is an unweighted mean and is likely still too high because the smallest province, Prince Edward Island, has the largest amount of improved land per farm. The comparison is not valid if other measures of productivity are considered such as, net income, or, profit per worker, since prairie farmers received larger net returns which are partially related to a more efficient operation due to economies of scale, and to different types of operation.

Differences in output per acre in the various regions cannot be attributed to physical factors alone, such as fertility of the soil and climatic conditions, because there are regional crop specializations that demand various degrees of labour and capital inputs. For example, if Ontario attempted to compete with the West on the same crop basis then the con-

2. Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.

trast in income per acre would not be so marked. (The long term wheat yields per acre in the prairie provinces and Ontario is 16.4 and 25.5 bushels per acre respectively. Computing the wheat yield for the average sized farm in each region would show that 3,902 bushels could be grown in Ontario whereas the prairie farm would yield 10,080 bushels. Even if the difference in price between hard wheat and Ontario grown, lower priced, soft wheat is ignored, there would be marked contrasts in income which not even average transportation costs to the lakehead of 18 cents per bushel on western wheat, could erase.)³

The number of weeks of labour expended per farm indicated in Table I, may provide a rough indication of the type of agricultural pursuit undertaken in the various regions of Canada. Intensity of labour as a crop indicator should be used with caution because it does not indicate underemployment on the farm. A case in point is British Columbia which appears in Table I to have the most intensive kind of farming in terms of labour inputs, in all of Canada. Much of the farming on the Fraser delta or in the Okanagan valley is intensive but no more so than in Ontario or Quebec. A possible explanation for the high average figure for labour inputs is that 45 per cent of the farms in British Columbia are either of a part-time nature or sold less than 1,200 dollars worth of agricultural produce in 1961. The latter figure probably indicates

3. Pers. comm., R. E. English, Statistician, Farm Economics Branch, Alberta Department of Agriculture.

that the operators were underemployed.. Labour used on the average farm in the Maritimes or Eastern Canada in 1961 was above the mean for Canada as a whole, whereas the average length of the work period on a prairie farm was the lowest for the entire nation.

One of the reasons for the disparity in the amount of labour expended per farm is the type of farming undertaken. Dairy farming as a commercial enterprise is exceeded only by horticulture in terms of the amount of labour needed for a successful operation. Both of the farming regions in the east acquired a major portion of their total gross farm income from this type of farming in 1961 whereas dairy receipts constituted roughly 7.4 per cent of total gross farm income on the prairies.⁴ This suggests one of the deterrents to dairying on the prairies. Because population densities are lower here than in the rest of Canada, not only is a market lacking for milk products but labour generally is not as plentiful and labour costs are likely to be higher. Therefore other types of farming are able to compete more favourably for the farmer's time. When the additional factor of low cost land is considered then it becomes just as, if not more, profitable to farm extensively on the prairies with fewer labour inputs as it is to farm more intensively on higher cost land in the eastern regions.

4. Canada, Dept. of Agriculture, Economics Division, Current Review of Agricultural Conditions in Canada, Vol. 24, No. 1, January 1963, p. 20.

A REGIONAL COMPARISON OF MILK PRODUCTION IN CANADA

If milk production per acre of land in farms is accepted as one of the indices of the degree of agricultural specialization, then Eastern Canada is the major dairy region for all of Canada and the Prairie Provinces are least involved with this kind of farming enterprise (see Table II). The percentage breakdown of cash income would appear to substantiate this conclusion because farmers in Eastern Canada earned 26.4 per cent of their gross farm revenue from dairying and farmers on the prairies only 7.4 per cent. This is not unexpected, of course, because the Prairie Region has traditionally been noted for wheat and, more recently, for beef production. However, it is not generally appreciated that the Prairie Provinces produced approximately 21 per cent of the total milk production in Canada in 1961, which is more than the production of British Columbia and the Maritime region combined. However a much smaller proportion of the milk produced in the Prairie Region is sold as fluid milk; therefore there are fewer specialized milk producers here than in other parts of Canada. On the other hand the proportion of milk sold to creameries for butter production is higher on the prairies (see Table II). Cream sales are important because market possibilities for fluid milk are low and because production of this commodity is an important component of a mixed farming and general livestock economy. Up to 90 per cent of the milk produced for cream sales remains on the farm as skim milk which means that

Table II All Census Farms - Dairy Production, Income Received and Disposal of Milk - 1961

Region	Milk Production in Pounds per acre of land in Farms *	Percentage of Gross Farm Income Received From Sale of Dairy Products	Disposal of Milk as a Percentage of Total Production		
			Fluid sales	Cream sales	Retained
Canada	10.0	15.9	57.0	31.0	12.0
Maritimes	16.5	21.0	40.5	35.2	24.3
Eastern Canada	36.7	26.4	68.5	22.7	8.8
Prairies	3.0	7.4	20.5	61.3	18.2
West Coast	16.0	24.4	87.0	4.3	8.7

Source: Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.
 Canada, Dept. of Agriculture, Economics Division,
Current Review of Agricultural Conditions in Canada,
 Vol. 24, No. 1, January 1963.

* For month of May 1961.

prairie milk producers retain a larger percentage of their total milk production as animal food for hogs and beef calves, than do producers in the east. (A correlation coefficient computed on a nation wide basis for the production of milk for cream and raising of hogs and cattle indicates that there is a high degree of correlation between these activities.)⁵ Therefore, although money received from the sale of dairy products totalled only 7.4 per cent of Alberta's gross farm receipts in 1961,

5. r is .8 for milk for cream and hogs and .6 for cream and beef cattle. Both values are significant at the .05 level. The Pearson Product Moment Correlation Coefficient was computed using data by provinces from the 1961 Census of Canada.

dairying is in fact indirectly providing additional income through the marketing of livestock. This is also an important source of income in eastern Canada in an absolute sense, but it is not an important aspect of the dairy industry in a relative sense because a much smaller proportion of the total milk output which is used for animal feed is retained on farms here either as skim or whole milk (see Table II).

Dairying on the Prairies

Alberta leads the Prairie Provinces in the number of milk cows and in total milk production. The dairy industry is not, however, as important in a relative sense to this province as it is to Manitoba because it contributes a smaller proportion of the total gross agricultural income (see Table III). Comparison of average herd size, the percentage of total census farms reporting cows kept for milk and the percentage of commercial farms reported as dairy establishments, indicate that dairying is most important in Manitoba followed by Alberta and Saskatchewan.

Milk is utilized in differing proportions for various purposes in each province. Alberta emphasizes the industrial uses of milk. When compared to the other two provinces Alberta uses almost twice as much milk to manufacture cheese and miscellaneous products and slightly more for creamery butter. Fluid sales account for a smaller proportion of provincial milk production in Alberta and per capita consumption is less than in the other Prairie Provinces. The urban

Table III Dairy Statistics for the Prairie Provinces
- 1961 -

	Alberta	Saskatchewan	Manitoba
No. of milk cows in '000's *	340	296	258
Average herd size	4.7	3.1	6.0
Cows per acre of land in farms	.0072	.0046	.0142
Percentage of farms reporting milk cows	61.0	52.5	63.0
Percentage of commercial farms reported as dairy farms	4.5	1.3	7.0
Total milk production in '000,000's of pounds	1720	1344	1128
Percentage of milk for creamery butter	55.7	49.4	52.4
Percentage of milk for cheese	1.3	0.1	0.8
Percentage of milk for miscellaneous manufacturing	6.8	3.0	3.5
Percentage of milk for fluid sales	21.5	25.6	28.4
Percentage of milk used on farms **	14.7	21.9	14.9
Percentage of gross income from milk sales	7.2	4.5	10.1
Main agricultural speciality in terms of percentage of gross income received	Cattle & Calves 27.3	Wheat 51.3	Wheat 26.8

Source: Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.
Canada. Dominion Bureau of Statistics, Dairy Statistics, 1963, Ottawa.
Canada. Dept. of Agriculture, Economics Division, Current Review of Agricultural Conditions in Canada, Vol. 24, No. 1, January 1963.

* Cows and yearling heifers kept for milk.

** Milk consumed in farm homes and fed to livestock.

population for Alberta, Saskatchewan, and Manitoba is approximately 843, 398 and 588 thousand respectively.⁶ If the percentage of farmers not reporting dairy cows is accepted as the percentage of rural people that must purchase milk then the possible market in Alberta, Saskatchewan and Manitoba rises to 1,033, 658 and 718 thousand respectively. Milk producers in Saskatchewan and Manitoba sold 460 and 450 pounds of milk per capita in 1961 whereas Alberta dairymen sold roughly 100 pounds less per capita.

Saskatchewan farmers are apparently attempting to be more self sufficient in dairy products because they retain a higher percentage of their milk output for farm needs than do producers in Alberta or Manitoba. It is difficult to explain this phenomenon because farmers in the other prairie provinces are purchasing much of their dairy requirements in local urban centres. However the lower percentage of farmers reporting milk cows in Saskatchewan when compared to Alberta or Manitoba indicates the difficulty of dairying in this province and it is possible that many farmers who are isolated from major service centres maintain dairy cows because they are forced to supply their own milk needs.

Although farmers in Manitoba obtained a larger proportion of their total gross farm income, in 1961, from the sale of dairy products, farmers in Alberta and Saskatchewan re-

6. Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.

ceived more money from dairy sales because they produced and sold a greater volume of milk. Dairying however, is more important to Manitoba and Alberta in a relative sense because it is part of their more predominantly mixed farm economy whereas it is less important in Saskatchewan because farmers here are highly specialized in one or two agricultural lines. For example, over 50 per cent of total gross farm income in Saskatchewan was received from wheat sales alone and over 75 per cent was derived from three agricultural endeavours. In the remaining prairie provinces, the same proportion of the gross farm income was acquired from five agricultural pursuits.

Dairy Areas in Alberta and Manitoba

Specialized dairying is carried on close to each important urban centre on the prairies. The area devoted to it is often so small, however, that this agricultural enterprise is not shown on the small scale "type of farming" maps which have been constructed by using census subdivisions as mapping units.⁷ Therefore specialized dairying in Saskatchewan cannot be discussed because no data exists, although in 1961 there were 1,032 farms which were classified in the dominion census as commercial dairy farms.

Those parts of the prairies in which farmers received at least 70 per cent of total farm income from the disposal of livestock and livestock products, and 40 per cent of this

7. S. C. Hudson et. al., Types of Farming in Canada, Publications of the Canada Dept. of Agriculture, No. 825, Ottawa, 1949.

Table IV Dairy Farming Areas in Alberta and Manitoba

Farm Characteristics	Alberta	Manitoba
Average farm size	259	239
Average herd size	6	6
Average number of beef cattle	3	0
Average number of swine	15	6
<hr/>		
Land Use as a Percentage of the Total Farm		
Improved land	56.00	35.00
Crop land	45.50	20.00
Seeded pasture	.05	.03
<hr/>		
Income Characteristics per farm in percentages		
Part time farms	18	24
Sales less than \$1,999	27	40
Sales over \$9,999	7	3

Source: G. A. Lane and J. G. Carson, Agricultural Statistics by Type of Farming Areas, Ottawa, 1956.

income figure is derived from the sale of dairy products alone, are classified as dairy areas.⁸ Both Alberta and Manitoba have two areas so classified. Those in Alberta occur immediately adjacent to Edmonton and Calgary, whereas one in Manitoba is in close proximity to Winnipeg and the other much larger area is farther south and east of this urban centre

8. G. A. Lane and J. G. Carson, Agricultural Statistics by Type of Farming Areas, Ottawa, 1956, p. ii.

in the Red River valley. Because the definition is fairly broad these areas are not necessarily composed of highly specialized fluid milk producers. It is more likely that they are a mixture of fluid milk shippers, mixed farms whose occupants emphasize cream and likely hog production, and, possibly, farmers who have no milk or cream sales at all but are included because they fall within the confines of the mapping unit. Mixing variables will, of course, make comparisons less valid but reference to outside material appears to substantiate the general patterns indicated here.

Farmers in the dairy areas in Alberta appear less specialized than their counterparts in Manitoba because the average farmer in Alberta raises beef cattle and hogs in addition to dairy cows on a farm which is only slightly larger than the average farm in the dairy areas of Manitoba. There is some indication that land is used more intensively in Alberta than in Manitoba, because there is a greater number of livestock units per acre and a larger percentage of the average farm is improved land, crop land and seeded pasture. Dairy areas in Alberta are exceeded only by wheat areas in the amount of improved land per farm, whereas Manitoba dairy areas have the least improved land of all types of farming except cattle raising. Patterson noted that dairying in Manitoba occurs "...where the lowest percentage of land is cultivated due to stones, impeded drainage or immediate necessity for soil

conservation and maintenance of fertility".⁹ Farms in the dairy areas of Alberta probably have more arable land because they came into existence in response to political regulation as well as economic factors. Dairy producers increased in numbers in response to urban demand for fluid milk and they located initially close to the market to minimize transportation costs and the danger of milk spoilage. As transportation improved, the importance of distance to market decreased while that of local feed costs increased.¹⁰ But dairymen in areas with lower feeding costs generally have not displaced milk producers with prime agricultural land closer to the market for a variety of reasons, one of which is, that prior to the second world war urban milksheds were fixed by the Milk Control Section of the Board of Public Utilities and the Edmonton and Calgary City Health Departments to an area within 15 and 20 miles respectively of these cities.¹¹ These regulations no longer apply but they were in force long enough to encourage the development of dairy areas immediately adjacent to the two cities. These areas continue to flourish, especially around Edmonton, because milk quota allotment restrictions instituted by the Board of Public Utilities favour dairymen who are already supplying milk to these cities. The Manitoba Milk

9. H. L. Patterson and H. W. Trevor, The Dairy Farm Business In Manitoba, 1942 to 1947, Ottawa, 1949, p. 11.

10. Loc.cit.

11. Pers. comm., B. J. McBain, Supervisor, Farm Cost Studies, Farm Economics Branch, Dept. of Agriculture, Alberta.

Control Board has not advocated the same restrictions for dairy farmers under its jurisdiction, and one of the results has been a tendency for Winnipeg's milk supply to come from areas with lower feeding costs, farther away from the city.¹² Prior to 1947, 85 per cent of the city's milk came from within 30 miles of the city, in 1947 the percentage dropped to 75 and has continued to decline to 61 per cent in 1961.¹³

Income characteristics provide additional evidence that farms in dairy areas in Alberta are used more intensively than in comparable areas in Manitoba. Approximately 18 per cent of these farms in Alberta were classified in 1961 as part time and 27 per cent had sales of less than \$1,999 whereas the figures for Manitoba were 27 and 40 per cent respectively. Alberta also had more farmers in these areas, in terms of percentages and absolute numbers, who reported sales over 9,999 dollars in 1961. Income per farm from the sale of farm products is likely higher in these areas in Alberta than in similar areas of Manitoba because a greater area of land is improved and sown in cash crops and because the average farm supports larger numbers of livestock.

Case studies appear to indicate that specialized dairying is also more intensive in Alberta than in Manitoba. Patterson and Trevor, for example, carried out studies of dairy farms in

12. H. L. Patterson and H. W. Trevor, op.cit., p. 11.

13. Manitoba. Milk Control Board, Annual Report, 1947, p. 4, and 1961, p. 2, Winnipeg.

Alberta and Manitoba from 1939 to 1947.¹⁴ The studies were conducted in different years in each of the provinces and sample farms were not chosen by random selection. Data are provided however, pertaining to the average size of farm, the amount of land used for crops, herd size and amount of capital invested in each dairy enterprise for successive years in each province.

Whole milk shippers in Alberta in the period 1941-1942 had dairy herds which averaged 43 animals per farm, with the farms having an average size of 402 acres. Sixty-three per cent of these average farms were in crop and the average capital investment was 25,879 dollars. Data compiled for Manitoba one year later indicate that fluid milk producers operated larger farms with an average area of 493 acres. Fifty-one per cent of the total farm area was used for crops, and each farmer maintained an average of 23 dairy cows per herd. Total investment per farm was roughly 21,575 dollars. Irrigation farming in the vicinity of Lethbridge produces higher yields per acre than most other prairie farming areas but greater amounts of capital and labour must be expended to achieve this result. It is these values for herd size, etc. that make the differences between the two provinces especially noticeable. However if the data for the irrigation area in proximity to Lethbridge are ignored Alberta still leads Manitoba in all

14. H. L. Patterson and H. W. Trevor, op.cit.
Patterson, H. L., Dairy Farm Business in Alberta, 1939-1943, Ottawa, 1948.

values except in capital invested per farm.

In summary, dairying in Alberta is more important than dairying in Manitoba in terms of total income realized, but less important here than in Manitoba in terms of the percentage that the sale of dairy products contributes to total farm income. On a provincial scale a greater proportion of the farms in Manitoba have dairy cows than is the case for Alberta or Saskatchewan. In addition, there are more dairy cows per acre of land in farms in Manitoba than elsewhere on the prairies.

An examination of these areas within the individual provinces, classified by G. A. Lane and J. G. Carson (Footnote 8) as dairy regions, indicates that farmers within these regions in Alberta appear to be less specialized than their counterparts in Manitoba, although they achieve a greater outturn of product than the average farm in the Manitoba dairy regions. Lastly, farms were also utilized more intensively in Alberta in 1939 to 1947 than in Manitoba.

No attempt has been made to compare dairy farms in terms of profit per farm and in the absence of data it cannot be assumed that the more intensive nature of dairy farming in Alberta is necessarily more profitable.

Comparison of Specialized Dairying Areas

Having cursorily examined some farm characteristics and the degree of specialization in dairying on a national level and in the west, it may be of interest to compare those areas

in Ontario and Alberta which have a dairy specialization in terms of the percentage of total gross income received from this type of farming. The criteria used in defining the areas is the same as that used in the foregoing section.¹⁵ Ontario, rather than Quebec, has been chosen as the standard against which Alberta will be compared because dairying is more commercial in Ontario.

Quebec has more dairy cows and commercial dairy farms than Ontario but yields per cow and per farm are decidedly lower. Cow breeding, as indicated by annual milk yields per cow, is better in Ontario and a larger proportion of the milk from these cows is sold on the fluid milk market for human consumption. Farmers in Quebec, on the other hand, retain a larger percentage of their product on the farm for animal feed and home use.

Alberta has a much lower percentage of farms specializing in milk production than Ontario and perhaps the most obvious reason is the lack of market demand. Most areas in which farmers are engaged in intensive dairying are in close proximity to urban places. This is particularly true in Alberta where the two major urban milksheds are located within these dairy areas. However farming in these specialized areas in the two provinces differ in the intensity of production.

The proportion of improved land and area in crops is similar for both provinces but there is less seeded pasture

15. G. A. Lane and J. G. Carson, op.cit., p.ii.

Table V A Comparison of Farms in Dairy Areas in
Alberta and Ontario.

	<u>Alberta</u>		<u>Ontario</u>	
	Number	Percent of total	Number	Percent of total
Number of farms	2,583	3.5	38,423	31.8
Average acres per farm	259		138	
Improved acres per farm	163	63.0	85	59.0
Acres of main crops	118	46.0	56	41.0
Acres of seeded pasture	13	4.0	22	14.5
Numbers of cattle	19		16	
Cows for milk	6	32.0	8	50.0
Milk production per farm *	3,390 lbs.		4,944 lbs.	
Milk production per acre *	13.1 lbs.		36 lbs.	

Source: G. A. Lane and J. G. Carson, Agricultural Statistics by Type of Farming Areas, Ottawa, 1956.

* In May 1961.

in Alberta both in terms of percentage of the total farm area and actual acreage (see Table V). If the percentage of the land occupied by crops on farms in the dairy areas in Alberta is converted to areal measure then there is a greater emphasis placed on crop production here than in Ontario. This is necessary because in addition to the lower average yields per acre discussed previously, a greater volume of feed per cow must be grown in Alberta because of the longer feeding period.

There are more livestock of all kinds, per farm, in the dairy areas of Alberta than in similar areas in Ontario, but a smaller number of them are dairy cows. The typical farm in these areas in Alberta maintains a dairy herd of six milking cows in addition to 13 other cattle kept for beef, 15 pigs and 177 chickens. In Ontario there are eight animals per herd, fewer beef cattle, only half the number of pigs and roughly two-thirds of the number of chickens on the average farm in the dairy areas.

Farms in these dairy districts in Alberta are almost twice as big as those in Ontario and yet milk production is decidedly less for a number of reasons. The most obvious are that there are fewer cows per herd, and milk production per cow is lower in the west than in Ontario. Perhaps this is a result of inferior breeding but the lower milk yield per cow is also related to the longer winter feeding period which tends to depress average production. Cows achieve peak production when grazed on fresh pastures. It is generally conceded that milk production is lower per cow with a winter calf than per cow with a spring calf because it is fed dry fodder during the winter stall feeding period. In Ontario green fodder is available for longer periods and milk production per cow is correspondingly higher. A final reason suggested for lower milk production per farm in Alberta is that the average farmer appears to be less specialized here than in Ontario. Not only is the average dairy herd smaller but the farmers are

likely achieving a large percentage of their gross farm revenue from the sale of other kinds of livestock and farm products.

CHAPTER II

A SHORT HISTORY OF DAIRYING IN ALBERTA

In many instances past events and political rulings have guided the development of the industry so that many aspects of dairying are difficult to understand if this part of the survey is ignored. A short history of dairying is offered, therefore, in the hope that the measures of specialization, discussed in the next chapter, and the present day distribution of dairying, described in Chapter IV, may be better understood.

DEVELOPMENT OF THE DAIRY INDUSTRY

One of the first instances of commercial dairying in the west took place in the Selkirk settlement at Fort Garry. Normally the fur trading companies did little to encourage agricultural settlement because farmers destroyed the habitat of fur bearing animals but in this case it was tolerated because it obviated the necessity of hauling supplies great distances for the Hudson's Bay Company. The Red River Settlement produced butter and other provisions for the trading posts farther inland and provided an excellent base for competition between the Hudson's Bay and the North West Companies.

Dairying in Alberta Prior to 1905

When the Hudson's Bay Company established forts it often attempted to reduce operating costs by maintaining small dairy herds, which had been acquired from Fort Garry. Later,

as agricultural settlement increased in magnitude, cattle were brought into what is now the province of Alberta from Montana and the Pacific Coast.¹ Most of these cattle were likely used to establish a ranching economy in southern Alberta, but large numbers were absorbed by smaller mixed farms. These farmers were, of necessity, self sufficient in perishable dairy products and their cows were used primarily to satisfy the needs of the farm household but occasionally when surplus butter and cheese were produced they were exchanged at local service centres for goods which were not easily manufactured or grown on the farm.

With the completion of the Canadian Pacific Railway in 1885 and with a general reduction in freight rates under the Crow's Nest Pass Agreement of 1897 an impetus was given to commercial dairying because production in excess of household needs could be shipped to the mining and lumbering centres in British Columbia.²

In 1888 the first dairy factory in Alberta was established near Calgary to take advantage of eastern and western markets now made available by the rail connections. Financially, this factory was not a success but it was the forerunner of commercial, industrial dairying with its attendant specialized milk suppliers and factory production.

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1. C. F. Prevey, The Development of the Dairy Industry of Alberta, Unpublished M.A. Thesis, University of Toronto, 1950, p. 5.
 2. H. A. Innis, Problems of Staple Production in Canada, Toronto, 1933, p. 9.

Other cheese factories and creameries were established shortly afterward near the larger urban settlements, which were also on railways. It is difficult to discern the most important pre-requisite for establishing a dairy processing plant in this period: proximity to a stable source of raw material or to a railway line. Many dairy businesses failed in spite of their rail connections because they were unable to achieve a high level of production in the absence of a constant supply of milk and it became necessary for the federal government to advance loans and to assume the management of these dairy plants on a temporary basis.

"The Laurier Liberal Ministry from 1896 to 1911 is best remembered for its contribution to the opening up of the Canadian West"³ and part of the settlement policy entailed encouraging a more stable mixed farming economy. In addition to temporarily managing dairy plants the government established new factories in likely areas, distributed imported eastern dairy cattle at nominal costs to farmers in the vicinity of the new venture, and marketed the finished product.

Growth of the Dairy Industry, 1905-1924

The period 1905-1924 was one of great expansion for the dairy industry in Alberta. Cattle increased in numbers four times from 101,245 to 433,628 and butter production expanded

3. J. J. Talman, Basic Documents in Canadian History, Toronto, 1959, pp. 122-123.

substantially.⁴ The total number of both cheese factories and creameries advanced from 49 in 1905 to 101 in 1924 with an increase in production from approximately two million pounds of butter and one million pounds of cheese in 1905 to roughly 22 million pounds of butter and 1.7 million pounds of cheese in 1924.⁵ This growth in productivity is a reflection of the rapid expansion of agriculture on the Canadian prairies. Dairy production did not keep pace with population increases because the local market was partially satisfied by butter from eastern Canada and from New Zealand via the port of Vancouver.

In 1911 the government withdrew from the manufacture of dairy products although it still aided the industry by marketing butter, establishing a system of inspection of plants and grading the final product. Federal and provincial aid to the newly developing industry had apparently been so successful that the privately owned dairy concerns were making it difficult for government operated firms to obtain raw material.⁶ Most of the creameries grew in size because they were located in expanding urban markets which possessed branch railway lines that extended deep into mixed farming, cream producing areas. In 1906, 86 per cent of Alberta's creameries each had

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4. Alberta. Dept. of Agriculture, Dairy Branch, Statistics of Progress, Province of Alberta, Edmonton, 1929.
 5. Pers. comm., D. McCallum, Dairy Commissioner, Dairy Branch, Dept. of Agriculture, Alberta.
 6. Alberta. Dept. of Agriculture, Annual Report, 1910, Edmonton, p. 100.

an annual capacity of less than 200,000 pounds; by 1924 only 22 per cent produced less than 200,000 pounds per annum.

The largest expansion of the dairy industry was coincident with the first world war. Alberta was able to recapture a large part of the domestic and British Columbian market because world demand for New Zealand butter had caused the price to increase so that, in spite of its lower quality, the Alberta product was able to compete very favourably.

It is likely that specialized dairy farming became well established in this period because by 1921 Calgary and Edmonton with more than 122,000 people provided a reliable whole milk and butter market. Although dairying was still subordinate to the growing of cash grain in the mixed farming areas, milk and cream were becoming an important source of year round income because dairy plants were more stable in their operation than they had been prior to 1911 and because local markets appeared reasonably secure.

A Period of Relative Decline, 1925-1929

The dairy industry experienced major readjustments in this five year period. The rapid expansion which had been experienced during and immediately after world war one came to an end because it was increasingly difficult to dispose of surpluses on the contracting export market. With the re-entry of New Zealand and Australian dairy products into Canada markets in Alberta and British Columbia began to contract. In 1925 Canadian imports and exports of butter were 198,000 pounds

and approximately 27 million pounds respectively; by 1929 this situation was reversed because imports totalled 26 million pounds and exports one and a half million pounds.⁷ At the same time, alternative farm products became more attractive because, although butter prices received at the creamery remained fairly stable, beef and wheat markets improved both in price and volume.⁸ Dairy farmers began to concentrate on cash crops and sold their heifers and calves for beef with the result that the combination of beef and dairy cattle sales depleted the total number of livestock remaining in the province (Fig. 1). Butter and cheese production declined because of the drop in cow numbers but creameries increased slightly in number with the result that the province suffered from plant overcapacity and the industry was less efficient.

The United Farmers of Alberta, a political movement, advocated cooperatives in this difficult economic period to process and market agricultural commodities. This resulted in the creation of a number of dairy pools or cooperatives, the largest of which were the Northern, Central, and Southern Alberta Dairy Pools. The provincial government used this opportunity to terminate its marketing policies and in 1927 withdrew from this activity.

7. Canada. Dominion Bureau of Statistics, Trade of Canada Exports Annual, 1920-1939, Ottawa.

8. Alberta. Dept. of Agriculture, Annual report, 1925, p. 1 and 1928, p. 2, Edmonton.

Depression and Drought, 1930-1939

Prices for agricultural commodities were uniformly low throughout this period, while operating costs remained comparatively high. (Indices of wholesale prices for Canadian farm products and prices of purchased commodities and services used by farmers are computed as 100 for 1935-1939. By comparison the ratio of farm prices to purchased inputs for Alberta is 1.14 for 1929, .90 for 1934, .87 for 1939 and 1.13 for 1944.)⁹ Farmers attempted to remedy this situation by increasing wheat acreages and the volume of livestock production. Cattle numbers rose to 1,700,600 by 1936 because it was more profitable to feed low cost grains than to sell them.¹⁰

The Hawley-Smoot 1930 Tariff Bill discouraged exports of agricultural commodities to the United States and western farmers began to retain stockers and feeders and finish them on the prairies for the British market which demanded a higher quality of beef. When this market failed to absorb all of these cattle some were utilized for milk production; so that by 1936 there was an unprecedented high of approximately 750,000 dairy cows in Alberta.

Wheat production proved uneconomic in the thirties, because depression prices were often lower than production

9. Alberta. Bureau of Statistics, Facts and Figures, Edmonton, 1954. Computed from tables 122 and 126, pp. 222 and 225.

10. Alberta. Dept. of Agriculture, Annual Report, 1931, p.15 and 1932, p. 7, Edmonton.

costs¹¹ and later, during periods of drought, yields per acre were negligible in southern portions of the province. The dairy commissioner reported in 1934 that, "On account of diminishing returns from grain crops many farmers were obliged to milk cows to supplement farm income".¹²

Milk output increased from about 1,000 million pounds in 1930 to 1,616 million pounds by 1939.¹³ Creamery butter production for 1930 and 1939 was 17,716 million and 29,749 million pounds respectively and cheese manufactures rose from approximately one to two million pounds in the same decade.

Throughout this chaotic economic period the industrial sector of the dairy economy generally experienced orderly growth. Plant numbers remained fairly constant and output per plant increased throughout the decade. Such was not the case for the primary producer. Milk and cream shippers increased in numbers from roughly 39,000 in 1932 to 53,000 in 1936 and 61,000 in 1939 with the result that sales per farmer became lower each year. Competition for fluid milk quotas in major urban markets resulted in prices so low that dairy farmers found it unprofitable to supply milk on a long term basis.

A number of attempts were made to aid the dairy industry.

11. G. E. Britnell, "The Depression in Rural Saskatchewan", The Canadian Economy and Its Problems, Toronto, 1934, p. 101.

12. Alberta. Dept. of Agriculture, Annual Report, 1934. Edmonton, p. 9.

13. C. F. Prevey, op.cit., p. 160.

The federal government imposed tariffs on dairy imports in 1932 and established the Federal Butter Export Stabilization Board in 1935 to create larger domestic and export markets for Canadian farmers. Under these conditions Alberta butter sales increased in British Columbia because imports from New Zealand were curtailed. The provincial government placed the Edmonton and Calgary milksheds under the control of the Board of Public Utilities in 1933. The Milk Control section of this board, in consultation with shippers and manufacturers, delineated the boundaries of the milkshed, licensed shippers and factories, and established prices for milk. These methods appeared successful in stabilizing the fluid milk industry and within a short time other major urban centres were placed under the control of the same authority.

By the end of the decade a number of factors indicated that the industry had regained a modicum of stability. For example, production expanded and except for a reversal in price in 1938 and 1939, prices increased steadily from the extreme lows experienced in the early thirties. Alberta dairy manufacturers were aided by the federal tariff and sold over 50 per cent of their butter each year to British Columbia. Finally, the Board of Public Utilities passed legislation designed to protect fluid milk markets from undue competition. At the same time, dairy processing became more rational with increasing productivity per plant and decreasing costs per unit.¹⁴

14. C. F. Prevey, op.cit., p. 199.

Unsuccessful ventures were weeded out by economic pressures, at first, and later in the decade by a provincial Licensing Advisory Board which was established to review the need for additional plants and for the renewal of licenses of existing ones.

The Second World War, 1940-1945

With the advent of the second world war the demand for agricultural commodities increased. Because prices encouraged wheat and beef production and labour was in short supply, dairy farming tended to be neglected until the federal government commissioned the Agricultural Food Board and Dairy Products Division of the Wartime Prices and Trade Board to regulate agriculture by means of subsidies, ceiling and floor prices, and acreage reduction payments on selected crops.

Creamery butter production reached over 38 million pounds in 1943, a figure that was not surpassed until 1961, and cheese output achieved a level that has not been duplicated to date. These manufactured milk products increased at a greater rate than did total milk production because subsidies on butterfat and milk for fluid sales or manufactures encouraged producers to sell a greater proportion of their milk output than had been the case in the previous decade.

Although butter and cheese production increased because of world shortages in these commodities, dairy processors in Alberta rarely, if ever, sold their product outside of the traditional provincial and British Columbian markets. Cheese

and butter output increased substantially from 1940 to 1945 because Alberta was able to dominate local markets in the absence of eastern cheese and New Zealand butter which were in greater demand overseas.¹⁵

The number of creameries continued to decline while output per plant increased, perhaps in response to labour shortages but most certainly because of the policies of the Licensing Advisory Committee. Except in 1942, 18 cheese factories operated in Alberta throughout the war but production varied from year to year in spite of federal subsidies of roughly 20 cents on a hundred pounds of milk because cheese makers were allowed to resell milk to fluid milk processors if they decided it was more profitable.¹⁶

This era in the history of the dairy industry of Alberta is best described as one of increased expansion incurred by the policies of the federal government and by the lack of competition from foreign and eastern Canadian competitors. Total milk output rose to a historic high of 1,789 million pounds in 1943 and a larger proportion than was normally the case entered commercial and industrial channels in response to local demand and federal subsidies.¹⁷ Production per

15. Alberta. Dept. of Agriculture, Annual Report, 1940, Edmonton, p. 53.

16. Alberta. Dept. of Agriculture, Annual Report, 1944, Edmonton, p. 46.

17. If the percentage of milk used for farm butter production is not considered in this example then the percentage of milk released into commercial channels was 66.4%

creamery expanded from 317,000 pounds of butter in 1940 to 406,000 pounds in 1944 and this level of productivity was not reached until the late 1950's and early 1960's. Even cheese output, which has rarely been an important part of Alberta's dairy economy, was more than double present day production.

Postwar Reconstruction to the Present, 1946-1961

Strong demand for dairy products in the immediate postwar period resulted in price increases after the removal of controls by the Wartime Prices and Trade Board. Farmers maintained milk production in spite of the loss of subsidies because milk and cream prices increased by more than 60 per cent and because other agricultural pursuits such as beef production, became less attractive with the removal of price supports for livestock, and the withdrawal of subsidies on feed grains. For most sectors of the agricultural economy immediate prospects appeared assured although many farmers feared an agricultural depression similar to the one following the first world war. Postwar reconstruction in Europe meant increased food sales to that part of the world and the Food and Agriculture Organization of the United Nations offered pros-

in 1935, 73% in 1940 and 86.3% in 1945. The rationale for ignoring milk used in the production of farm butter is the difficulty in discerning the proportion of this commodity that entered the butter market.

Source of statistics: Alberta. Dept. of Agriculture, Dairy Branch, Annual Report, Edmonton, 1962.

pects of increased international trade in primary products. However many of these prospects did not materialize with the result that total cheese and creamery butter production and output per plant declined in the late forties. This trend was not arrested for butter output until 1952 and the cheese industry has not yet regained its former prominence. Most of the problems of the industry were old ones. Canadian butter exports were reduced from over 45 million pounds in 1946 to 10 million pounds in 1950 and later in 1960 to 1,710,000 pounds because of increased competition for world markets.¹⁸ Alberta, once again, began to lose control of butter markets in British Columbia because of increased competition from New Zealand. Local demands for cheese were supplied from eastern Canada. Finally, beef and wheat production offered more attractive farming alternatives, especially later in the fifties.

In 1949 the domestic butter market was threatened by oleomargarine but a number of steps were taken to protect the butter industry. The Alberta Legislature assented to "An Act Respecting the Regulation of Control of Margarine"¹⁹ which required that margarine not be coloured yellow and that if it were served in public eating places as a butter substitute there must be prominent notice given of this fact. An Order in Council at the federal level instituted a measure

18. Canada. Dominion Bureau of Statistics, Canada Yearbook, 1947, 1951 and 1961, Canada. Ottawa.

19. Alberta. Dept. of Agriculture, Annual Report, 1949, Edmonton, 1950, p. 62.

under the Agricultural Price Support Act to stabilize butter prices, by the use of price supports and purchasing policies which allowed surplus butter to be sold to the Prices Support Board. Margarine continues to be a threat however, because sales in Alberta in 1950 were 19.2 per cent of total Alberta butter production and they have increased each year to 26 per cent of butter production in 1961.

Farming in the fifties became difficult because costs rose more rapidly than prices for agricultural commodities. The ratio of farm prices to purchased inputs declined from 134 in the period 1949-1953 to 117.1 in 1954-1959.²⁰ Milk production dropped from over 1600 million pounds in 1949 to 1,430 million pounds in 1955 but increased again to 1,550 million pounds at the end of the decade. Although the beef industry expanded in response to increased demand for meats dairy cattle continued to decline in numbers, partially because of reduced demand for milk but perhaps, more importantly because dairymen were beginning to upgrade the quality of their stock so that fewer cows were needed to produce a given quantity of milk. Creameries, however, became less efficient because of decreased production per plant in the early part of the decade. This condition was shortlived because the number of plants was reduced from 92 in 1950 to 86 in 1961. At the same time butter production, after its initial drop

20. W. Mackenzie, "The Terms of Trade, Productivity, and Income of Canadian Agriculture", Canadian Journal of Agricultural Economics, Vol. 9, No. 2, 1961.

from 1949 to 1952, increased from 27 million pounds in 1952 to 40 million pounds in 1961. By 1961 productivity per creamery was beginning to equal wartime levels.

Remedies for low farming returns came from two major directions throughout the fifties and early sixties. The federal government applied import controls and support prices on non-fat, dry milk products, cheese and butter and, farmers made their operations more efficient. Milk producers became much more specialized in this period. They began to employ many techniques, such as, undertaking larger operations and maintaining records of the performance of individual cows. This resulted in increased milk yields per animal and per farm.

CHAPTER III

TRENDS OF SPECIALIZATION OF DAIRYING
IN ALBERTA

Farming as a way of life is being superseded by farming as a commercial venture. In order to compete in modern markets farmers are concentrating their efforts along narrower lines by specializing in fewer agricultural ventures on a larger scale. Dairying, too, has generally become more specialized in Alberta with fewer farmers maintaining larger herds which produce increasingly large yields of milk per cow.

Dairying has never been one of the major agricultural enterprises in Alberta. In 1920 the sale of dairy products contributed 5.6 per cent (see Table VI) of total farm income derived from the sale of farm products. Prior to this date a

Table VI Dairy Returns as a Percentage of Cash
Income from the Sale of Farm Products
in Alberta.

Year	1920	1926	1931	1936	1941	1946	1951	1956	1961
Percentage	5.6	6.5	11.7	10.2	8.2	11.5	8.4	8.4	8.7

Source: Canada. Dominion Bureau of Statistics, Quarterly Bulletin of Agricultural Statistics, Ottawa, 1926-1961.
Canada. Dominion Bureau of Statistics, Sixth Census of Canada, 1921, Ottawa.

greater proportion of Alberta's milk production appears to have been used primarily on the farmstead, and sales to creameries for butter manufacturing appeared almost incidental to the main farm business of grain and beef production. The importance of dairying was greatest during the decade of the thirties, not because the rate of growth of milk output increased but because dairy products proved saleable when other agricultural commodities were not.

From the end of the thirties to the present the number of farmers who maintained dairy cows declined (see Table VII) and at the same time the total number of cows was reduced by 40 per cent (see Fig. 1). Milk output did not decrease correspondingly and, in fact, after an initial drop in the later forties it has continued to increase in volume to the present (see Fig. 1). Dairy returns, expressed as a percentage of the total cash income which is received from the sale of farm

Table VII Farms with Dairy Cows which were Milked
as a Percentage of the Total Number of
Census Farms.

Year	1916*	1921	1926	1931**	1936	1941	1946	1951	1956	1961
Percent- age	73	79	-	70	79	76	73	71	65	61

Source: Canada. Dominion Bureau of Statistics, Census of Canada, 1921-1961, Ottawa.
Canada. Dominion Bureau of Statistics, Census of the Prairie Provinces, 1916-1946, Ottawa.

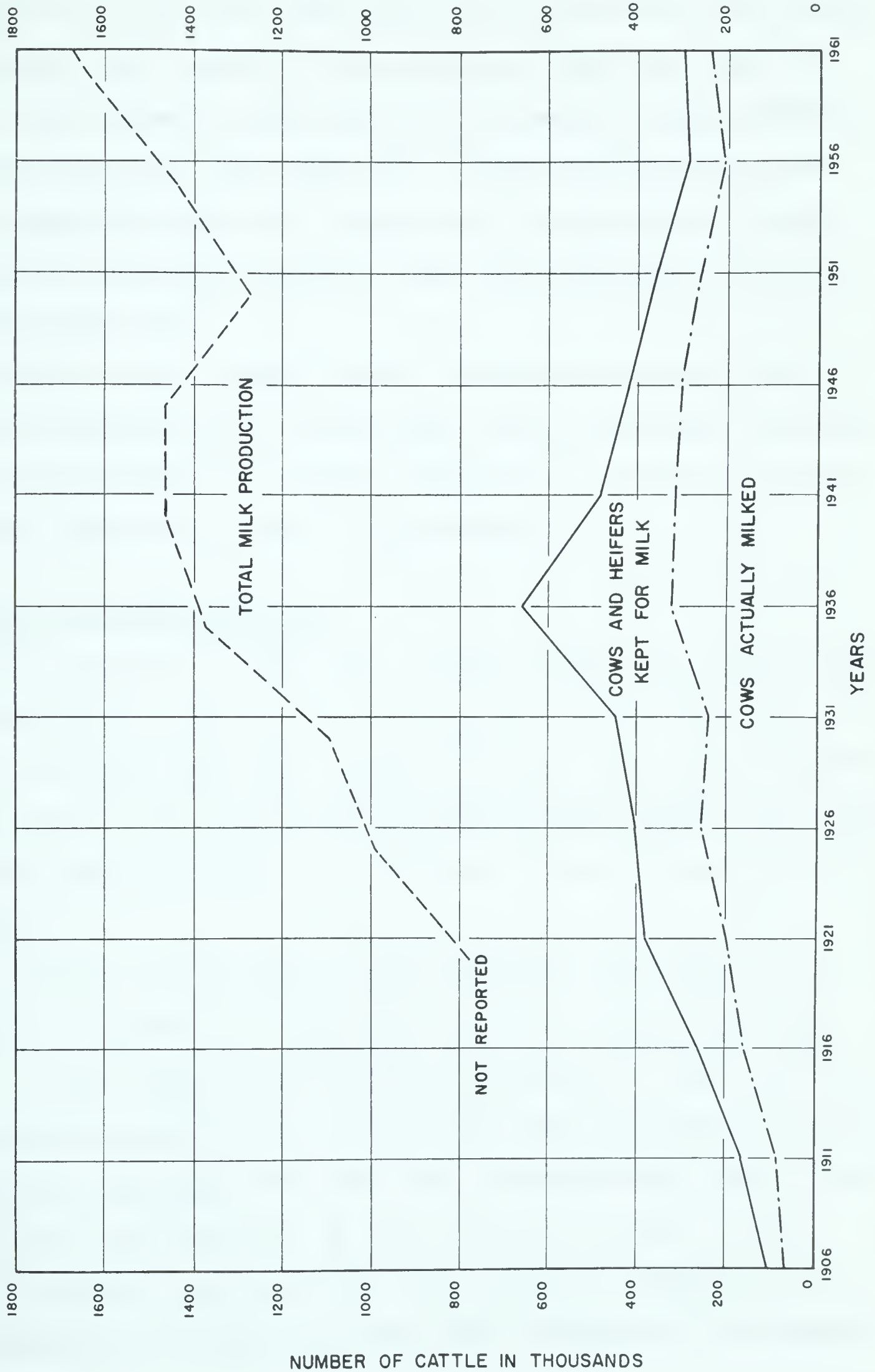
* Dairy cows defined as milch cows.

** Dairy cows defined as cows in milk or calf.

MILK PRODUCTION IN MILLIONS OF POUNDS

Fig. 1

MILK PRODUCTION - COWS AND HEIFERS KEPT FOR MILK - COWS MILKED IN ALBERTA
1906 - 1961



SOURCES: BASED ON DOMINION BUREAU OF STATISTICS, CENSUS OF CANADA, 1906 - 1961
ANNUAL REPORT OF THE DAIRY BRANCH, PROVINCE OF ALBERTA, 1961

products, has grown at the same rate as the local farm economy throughout this period so that between 8 and 9 per cent of total farm income was derived from the sale of dairy products from 1941 to 1961 (see Table VI). The only time that this percentage exceeded these figures was during the war years, because of increased domestic sales and government subsidies on milk and cream.

These trends towards higher absolute production and increased production per cow and per farm have become especially noticeable in the last decade and they are related to the increased commercialization of agriculture.

MEASURES OF SPECIALIZATION

It is easier to say that farming is becoming increasingly specialized than to measure the degree of specialization. A number of approaches are examined however, and, taken together, they seem to indicate the importance of dairying and its level of development in the farm economies of the various parts of Alberta.

Farmers may own dairy cows and report this fact in the decennial censuses of Canada but this is no guarantee that all of these animals will actually be milked. This possibility appears greater for cows on farms where dairying is only marginally important than for cows on specialized dairy farms. Therefore the proportion of cows actually milked, of the total number of cows kept for this purpose, expressed as a percentage, is probably an excellent indication of the degree

of specialization within the industry.

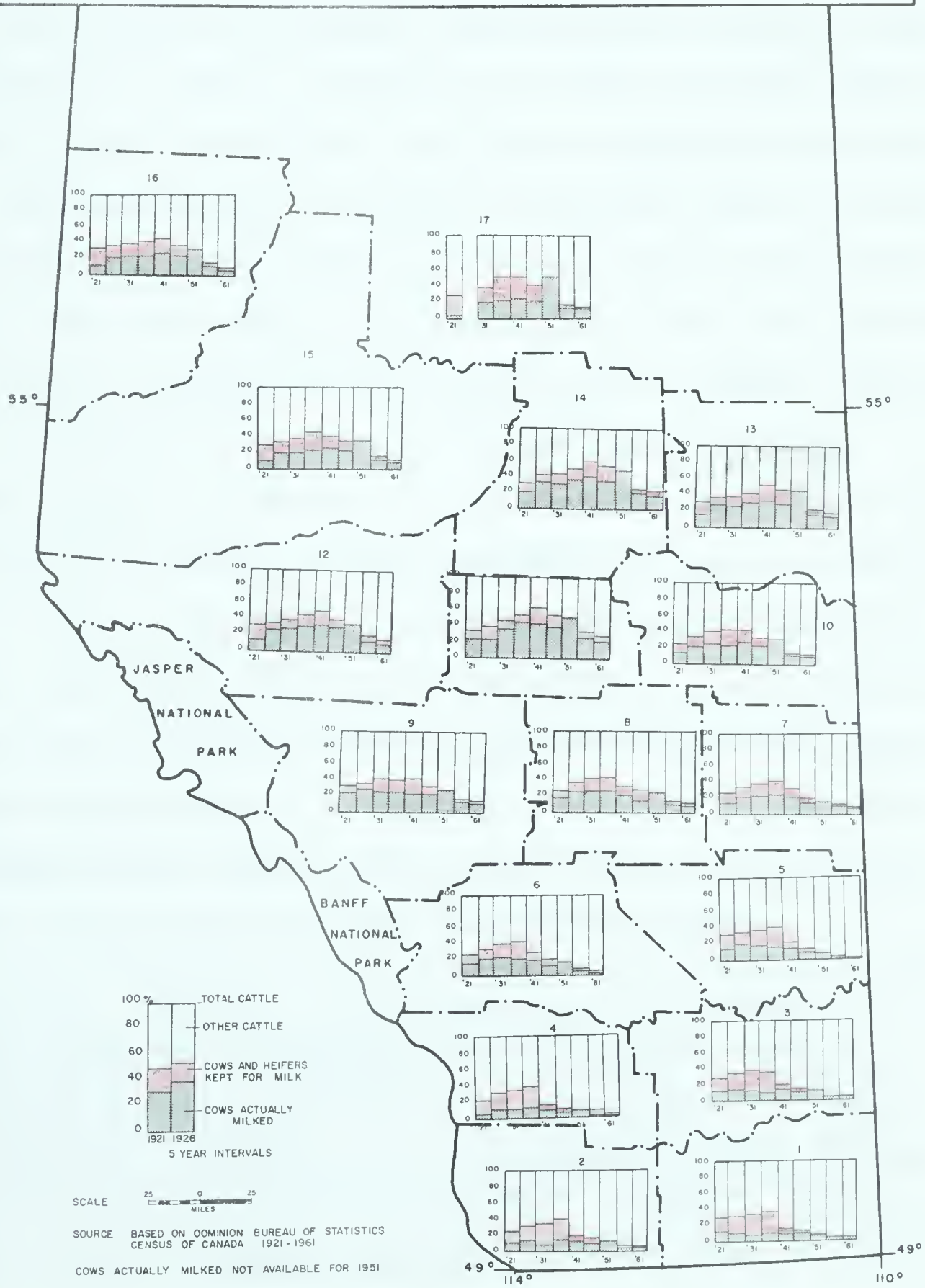
In the early history of the province cows were kept to supply farm needs, and it was only occasionally that surplus butter was sold. As long as the farmers' needs were satisfied it is likely that it was of little importance what proportion of each herd was actually lactating.¹ Later, from approximately 1900 to 1920, railway construction and the first World War enhanced markets for dairy produce and throughout this period more cows per herd were milked than in any subsequent decade until the fifties (See Fig. 1 and Map 2). This measure may be an indication of early specialization, but unfortunately it may also be a reflection of the lack of precise definitions and procedure for the execution of the early censuses of the prairies. In any case, no matter how dairy cattle were defined in any period the definition was likely the same for the entire province and regional differences in the development of dairying within Alberta can be illustrated by the use of this device.

Farmers in the south, for example, where commercial dairying has rarely been important, have traditionally milked only a small proportion of the cows and heifers kept for this purpose (see Map 2).² Cows, which could be used for

1. Alberta Dairymen's Association, Coming of Age, 1940, Edmonton, p. 32.

2. Designations, such as southern, central and northern Alberta have come, through common usage, to mean areas in Alberta which are not necessarily coincident with the geographic southern, central or northern parts of the

COWS AND HEIFERS AS A PERCENTAGE OF TOTAL CATTLE NUMBERS
COWS MILKED AS A PERCENTAGE OF COWS AND HEIFERS



milk or beef, depending on market conditions, were kept to supply home needs and in some cases to act as nurse cows for beef calves. For the most part only those farmers close to urban markets viewed milk production as a commercial operation. But as time went on and the trend towards increased specialization became more firmly established these southern farmers, like most farmers in Alberta, tended to buy more of their food requirements and discarded the practice of supplying their own milk. Those people who continued to maintain dairy cows have become more specialized and are milking a greater percentage of their herds for longer periods of time. The last mentioned point has also resulted in cows dwindling in numbers, because fewer are needed to maintain a constant volume of milk.

The pattern in division 17 in northern Alberta is similar to that of the southern census divisions, in that a large proportion, and in some years a major proportion, of the cows kept for milk are not used for this purpose. The pattern is not the same in southern Alberta and division 17 for identical years since advances in farming techniques in the north have lagged behind those of the south because this northern area has, until recently, been the pioneer fringe.³

province. Calgary, in division 6, is in southern Alberta, Red Deer in division 8 is in central Alberta, while Edmonton in division 11 is accepted as being in northern Alberta. Therefore for the purposes of this discussion divisions 1 to 6 are synonymous with southern Alberta, divisions 7 to 9 represent central Alberta and the remaining divisions comprise northern Alberta.

3. D. F. Putnam, Canadian Regions, Toronto, 1952, p. 391.

Even today there is a greater emphasis on self-sufficiency in the poorer farming areas in division 17 than occurs farther south. But lately cattle in division 17 are beginning to be bred for their ultimate purpose. Now there is greater differentiation here between milk cows and cattle raised for beef with the result that increasing numbers of cows kept for milk are bred expressly for this purpose. With better farm management in division 17, especially in the last few years, the percentage of cows milked of the total numbers of cows kept for milk has increased appreciably.

Historically, there has been greater interest in milk production in the central part of the province than in either the north or south, because mixed farming is predominant here and because urban markets are larger. Percentages of cows milked in these census divisions were higher than in other parts of the province in almost every year except 1936 when many cows of poor quality were shipped from the south because of the economic and the drought conditions, and added to the more northerly herds.

Provincially (Fig.1) the proportion of dry cows (cows kept for milk but not milked) has declined steadily from the thirties to the present and appears to correlate with the recent trend towards increased commercialization of agriculture. A greater proportion of each dairy herd is being used intensively for milk production in most areas within the province. This feature has become most noticeable within the last ten

years but it appears that regional differences can be illustrated using this index of specialization.

Breeds

In the majority of cases the degree or quality of breeding of dairy cattle is directly related to their importance as a source of income. Therefore, in many instances, an analysis of breeding may indicate to what degree farmers are specializing in milk production.

Both the federal and provincial governments have encouraged prairie dairymen to upgrade their stock. As early as 1898 the federal government instituted a programme whereby purebred cattle were purchased in the east and sold in the west at cost, plus a subsidized transportation charge.⁴ Nevertheless, improvement in breed has proceeded at a rather leisurely pace with one per cent of the milk cow population reported as purebred in 1901, three per cent in 1931 and a reduction to approximately two per cent in 1941. Improvements that had been achieved prior to 1930 were reversed during the depression because mixed breed beef cows were utilized as dairy animals and their poor lines were likely passed along to their progeny.

The provincial government assumed control of the federal Dairy Herd Improvement Programme in 1933 and provided breeding information and, more recently, insemination service

4. Canada. Dominion Bureau of Statistics, Report, North West Territories, 1898, Ottawa, p. 46.

through the Department of Agriculture. This programme has achieved noticeable results, especially within the last ten to twelve years (see Table VIII). The number of purebred cattle

Table VIII Registration of Purebred Holstein Cattle

Year	Alberta
1910	4
1920	88
1930	146
1940	112
1950	1104
1960	2028
1961	2232

Source: Pers. comm., Holstein Friesian Association.

registrations with the Canadian Holstein Friesian Association were less than 200 from 1910 to 1940; by 1950 they had increased to 1,104 and in 1961 the 1950 figure was doubled to 2,232.⁵

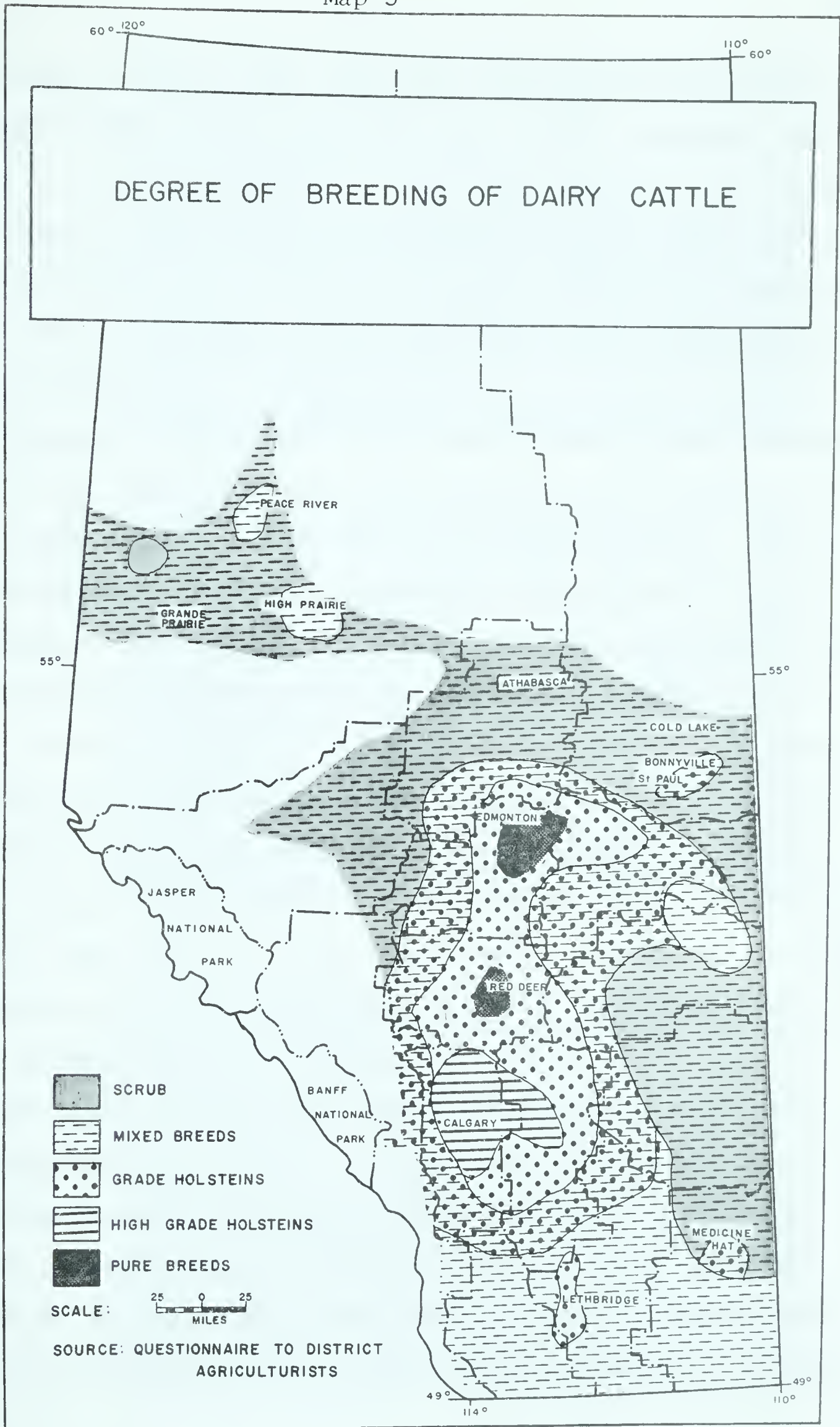
Cattle with Holstein Friesian characteristics have constituted a major proportion of Alberta's dairy cow population from 1911 to the present because they have demonstrated the necessary stamina to withstand the rigors of the Canadian northwest, and more important, milk production per cow is

5. Pers. comm., Holstein Friesian Association.

greatest for this breed. Other breeds, such as Ayrshires, were important until the end of the thirties but they have since declined in numbers.

A map showing the degree of breeding of dairy cattle has been constructed using data received from a questionnaire sent to all district agriculturists. In the absence of proof of pure breeding the problem is subjective, depending not only upon the degree of familiarity that each agricultural representative has with his area but also upon the interpretation given to the terms "scrub", "mixed breed", and "grade Holstein". Therefore, because the map represents subjective data and because it has been generalized from only 42 reference points, it may not possess the degree of accuracy ascribed to maps compiled from more objective material. It is, nevertheless, valuable in that it indicates those areas of the province in which specialized dairying takes place.

The distribution of the quality of dairy cattle appears to reflect both the uses to which they are put and local physical conditions. Many of the farms in the poorer agricultural areas, namely those located on grey wooded soils in the northeast part of the province, from Athabasca southeast to Cold Lake, have cows which are so thoroughly mixed in terms of breed that it is often difficult to discern their ancestry. This condition holds true for those areas of the Peace River district which have been cleared recently or are still in the process of being adapted for agricultural use.



Within this northern area there are local concentrations of cows with higher degrees of breeding than the average, which appear to reflect increased market opportunities. For example, Peace River, High Prairie and the Bonnyville-St. Paul district have creameries, and in two cases fluid milk processing plants, which likely encourage a more commercial type of dairying in their proximity.

Farmers in the older, well established districts, farther south in the province, generally maintain better bred cows which range from mixed breeds to purebred Holsteins. There are exceptions to this generalization, of course, because a combination of scrub and mixed breed dairy cattle occur in the semi-arid east central and extreme southern portions of Alberta. Better bred cows are situated in predominantly mixed farming areas which are located in the irrigation districts of the south, and on the more fertile soil areas farther west north. Cows of the highest quality are co-incident with the Edmonton, Red Deer and Calgary milksheds, in which fluid milk is produced for human consumption and for the manufacture of a wide variety of milk products.

The degree of breeding likely reflects more than just the importance of dairying in some parts of Alberta. It is generally accepted that specialized milk producers are extremely conscious of the quality of their animals, and the records of the Dairy Herd Improvement Programme substantiate this idea because the use of artificial insemination is great-



Illus. 1. Mixed breed cows in Northern Alberta.



Illus. 2. Grade Holsteins associated with mixed farming in the Bonnyville-St. Paul district.



Illus. 3. Purebred Holsteins in the Edmonton milkshed.

est in those parts of the province which produce fluid milk. However, poor breeding may demonstrate not only a lack of interest in dairying because some other enterprise is more important; for example, beef and grain production in east central Alberta, but it may also indicate that an area is in an early stage of agricultural development and that, although cream sales are an important source of farm income, breeding is poor because of the lack of capital to purchase high quality animals.

Production Per Cow

Milk production per cow has generally increased in Alberta from at least 1921 to the present (see Table IX). This increase has been most noticeable in the last decade, especially for those areas in which specialized dairymen produce fluid milk for human consumption. The following discussion outlines some of the factors which have influenced production both in the province as a whole and in specific parts of Alberta.

One of the objectives of the federal government in instituting the Dairy Herd Improvement Programme early in the twentieth century was to record milk production per cow so that farmers could identify and cull undesirable animals from their herds. The federal programme was most successful near the end of the twenties and beginning of the thirties. Eighty-seven herds composed of 289 animals were tested in 1929 and the figure rose to 4,220 dairy cows in 409 herds in 1931.

In 1933 the federal government withdrew from this programme in Alberta and the provincial government in the absence of staff and funds was forced to convert the federal testing procedure to a mailing system whereby farmers sampled their own herds and maintained their own records. The programme immediately lost momentum and remained ineffective until the beginning of the second world war. Farmers were optimistic about market possibilities with the advent of another world war since export markets had expanded during the first. This may explain the increased interest in herd improvement in 1939-40. But markets for dairy products failed to materialize until the war was well advanced and by this time the number of participants in the programme had declined. When demand did increase it was experienced in the domestic market, not from Great Britain, and in the absence of competition from other countries the quality of both cows and milk products declined.⁶ The number of animals registered in the scheme decreased steadily from 2,094 in 1942 to 1,178 in 1945. This trend was arrested and reversed in the postwar period and the number of cows tested has increased appreciably ever since. At the same time provincial figures for production per cow suggest that the desired goal of increased production has been achieved, at least partly, in response to the policies of the Dairy Herd Improvement Programme (Table IX).

6. Alberta. Dept. of Agriculture, Annual Report, 1945, Edmonton. The percentage of both butter and cheese graded as first class declined in the years 1942-44.

Table IX

Production per Cow

Year	Pro- vincial Average	Division																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1921	3537	3645	3654	3512	4250	3863	4069	3551	3623	3562	3113	3694	3955	2913	3275	3422	3779	2248
1926	4461	4036	4380	4316	4822	4658	4764	4440	4717	4487	3830	4411	4773	4032	3789	5082	4834	--
1931	4432	3930	4606	4058	4777	4346	5004	4673	4838	4371	3992	4840	4591	3846	4103	4394	4795	4185
1936	4236	3882	4554	4292	4804	4437	4936	4327	4676	4261	3838	4770	4302	3618	3863	3595	4342	3531
1941	4680	4168	5544	4433	5080	4606	5434	4422	6208	4599	4031	5126	4801	3664	4334	4530	4816	3769
1946	4270	4159	4611	4436	4447	4449	5007	4250	4513	4589	3894	4771	3906	3817	3986	4026	4035	3706
1951 ¹																		
			</															

Source: Computed from Canada. Dominion Bureau of Statistics, Census of Canada, 1921-1961, Ottawa.

1. Number of cows actually milked is not reported for 1951.

2. The number of census divisions was reduced from 17 to 15 after 1951.
Map 2 indicates 17 census divisions whereas Map 6 illustrates 15 divisions.

The results for cows currently enrolled in the testing programme are even higher. For example, annual milk production was more than 11,000 pounds per cow for the 14,000 cows tested in 1963.

The average production per cow has increased most noticeably within the last decade for the province as a whole (see Table IX) but increments in milk production per cow for different census divisions for the same period suggest that there are regional dissimilarities. If some of the factors which affect farming are examined from 1921 to 1961 then many of the underlying reasons for these variations become more apparent.

In 1921, the first year in which cows actually milked were recorded, cows with the highest milk yields in Alberta were located near Calgary in census divisions 4 and 6 (see Table IX). Dairy animals in proximity to other major urban centres such as Medicine Hat, Lethbridge, Red Deer and Edmonton were likely of higher quality than the average because of excellent market opportunities and as a result production figures for the census divisions in which these cities are located were generally higher than those for the remaining political divisions. There are anomalies however, which are difficult to explain. For example, in 1921 production figures for division 12 were higher than those for division 11 although the first has no major cities and the latter contains the provincial capital. In the same year figures for the northern divisions were generally lower than

the rest of the province perhaps because agriculture in this area was in a less advanced stage because it was settled later. The only exception to this generalization occurred in division 16 in which the main urban centres of the Peace River district are located.

As time passed, production figures for the southern census divisions in which irrigation has become important rose to a greater extent than did those for areas in which dry farming or ranching is the predominant agricultural pursuit. After 1926, for example, farmers in census division 2 maintained dairy cows with consistently greater milk output than their counterparts in divisions 1 or 3 where irrigation was less important.

Farther north milk producers in census division 11 gradually improved their stock so that by 1961 milk production per cow was greater than that of cows kept to supply Calgary's milk needs. Manufacturers of dairy products and fluid milk processors in Red Deer have traditionally obtained their milk from census divisions 8 and 9. This constant demand for manufacturing milk induced farmers to refine their operation so that production per cow has remained consistently high in this area. But it was rarely as high as that encountered in areas associated with Calgary or Edmonton because much of the milk is produced by mixed farmers who are selling a product for which neither the standards nor cash returns are as high as those associated with fluid or market milk. Interest in the quality

or milk producing capabilities of dairy cows under these conditions is therefore correspondingly lower.

Throughout the period from 1921 to 1961 average milk yields per cow have been lower farther north and west than those in the more heavily settled parts of the province.

In summary, yields per cow have increased everywhere in Alberta within the last forty years but improvement has taken place at a greater rate in some areas than in others. Production figures indicate that dairying in southern Alberta is more important where irrigation is practised than in those areas lacking irrigation. Milk production per cow has increased most rapidly in central Alberta. This area is well suited to dairying and mixed farming and there are excellent opportunities to sell milk in the local fluid milk markets or to manufacturers who sell a large proportion of their product outside of the province. Milk yields in northern Alberta are increasing at a slower rate than in the remainder of the province, although in terms of rainfall and soils the north is one of the more suitable areas for milk production. The major deterrents to dairying in this part of the province are, however, distance to market and the lack of good transportation facilities.

Herd Size

Size of herd affects the profitability of dairying. Patterson demonstrated that costs per pound of butterfat in 1941 in the Edmonton district increased as herds were enlarged from one to sixteen animals.⁷ He went on to show that if

7. H. L. Patterson, Dairy Farm Business in Alberta, 1939-1943, Ottawa, 1948, p. 35.

the number of cows kept for churning cream or milk for manufactured products was between roughly ten and eighteen then the dairyman lost money because costs for added equipment were greater than returns from the sale of dairy products. Records of fluid milk shippers demonstrate the same general trend; decreasing profits as herd size increases from ten to sixteen animals, then a rapid increment in profitability until a maximum is reached with roughly 28 cows and finally, a decreasing rate of return with the addition of more animals to the herd. Changes in technology and/or the ratio of prices of inputs and milk output will likely cause changes in the minimum size of herd which can be kept for profitable milk production. Nevertheless it seems probable that there will always be a minimum size for profitable herds.

Economic principles are not solely responsible for herd size in Alberta because another important local factor that encourages increases in herd size is the method used by the Board of Public Utilities for distributing milk quotas. In 1953 the average size of herd kept for production of fluid milk in the Edmonton milkshed was 18 (see Table X); by 1961, this figure had risen to 27. Certainly herd size is increasing because the larger dairy operation is a more viable enterprise but probably more important is the fact that it is increasing because a dairyman who has already demonstrated his ability to fulfil past quota requirements is given the right to ship more milk to market when additional quotas are allot-

Table X Average Size of Herd

Provincial				Edmonton	
Year	Census Milk Cows	Cows Actually Milked	3 Census Years Floating Mean	Year	Edmonton Milkshed
1916	5.7				
1921	5.8	3.2		1953	18
1926	6.8	4.3	3.7	1954	20
1931	7.0	3.5	4.0	1955	21
1936	8.0	4.3	4.0	1956	22
1941	6.1	4.1	4.3	1957	22
1946	6.4	4.6	4.4	1958	24
1951	6.0	-	4.4	1959	25
1956	5.4	4.2	4.8	1960	26
1961	6.4	5.4		1961	27

Source: Provincial - Canada. Dominion Bureau of Statistics, Census, 1906-1961, Ottawa.
 Edmonton - Pers. comm., Public Utilities Board of Alberta.

ted. Therefore expansion in herd size increases the likelihood of further expansion and generally results in the eventual exclusion from the market of smaller dairy concerns.

Wide differences obscure any long range pattern in herd size in Alberta. The average number of cows per farm reporting dairy cows has fluctuated between 5.4 and 8 in the 45 year period between 1916 and 1961. Before 1916 the number of farms with milk cows is not reported in the census of Canada, and

therefore no direct comparisons can be made between herd sizes before and after 1916. The largest herds appear to have been maintained during the depression and the smallest quite recently in 1956. If the figure for herd size is refined by considering only those animals actually milked per-farm-reporting-cows then Table X indicates that the effective herd size has been increasing throughout Alberta's short history, since the largest herds occurred in 1946 and 1961, rather than in 1936. The trend is indicated more clearly with the use of a floating mean (using three census years) of the average number of cows actually milked from 1921 to 1961. There is a consistent rise from 3.7 cows per herd in 1926 to 4.8 cows in 1956.

The largest dairy herds in 1961 were located in those census divisions which contained the major cities in Alberta (see Table XI). Size of dairy herd also appears to correlate with the amount of irrigated farmland in census divisions 1 to 5 which were established in 1956.⁸ There are 443,769 acres irrigated in division 2, roughly 52,000 people in urban places and an average herd size of 4.8.⁹ The other census divisions have less irrigated land, fewer urban people comprising the local market and on the average fewer cows per herd. For example, in division 1 there are 54,645 acres irrigated, an urban population of approximately 29,000 people and herds

8. See footnote below Table IX, p. 56.

9. Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.

Table XI Herd Size by Census Division in 1961

Division	Herd Size	Division	Herd Size
1	4.0	9	5.2
2	4.8	10	5.5
3	3.9	11	8.1
4	3.2	12	5.2
5	4.0	13	5.5
6	7.1	14	5.1
7	5.0	15	3.1
8	6.2	Provincial Average	5.4

Source: Computed from Canada. Dominion Bureau of Statistics, Census of Canada, 1961, v. 5, tables 19 and 27.

averaging 4.0 animals in size whereas just over 25,000 irrigated acres are located in division 3, roughly 13,000 urban people and slightly smaller herd sizes approximating 3.9 animals. It may be argued that the larger herds are merely indicative of specialization in response to nearby urban market opportunities because these herds are located on irrigated farms close to the largest southern city, Lethbridge. There seems to be a tendency however, for milk production in this locality to outrun demand. This was demonstrated recently when a Lethbridge milk processor challenged local municipal bylaws by selling milk outside of his allotted sales area. Dairymen in the Lethbridge area were able to supply him with all the milk he needed so that they were, in effect, "exporting" milk as far north as Red Deer.

Northern dairy herds in division 12 to 15 are larger on the average than those in the southern parts of Alberta. Average herd size for the north is 4.8 whereas the average for the aforementioned divisions in the south is 4.0.

Comparisons between herd size in 1921 and 1961 are difficult because the boundaries and numbers of census divisions were revised by 1956. There is marginal evidence that today's distribution of the size of dairy herds was fairly well established prior to 1921.¹⁰ Those changes that have taken place indicate a slight shift northward in the location of a majority of the larger dairy herds. In 1921 the largest herds were located near Red Deer in division 8 followed by herds in divisions 11 and 6 which were situated in proximity to Edmonton and Calgary. By 1961 the largest were in proximity to Edmonton in division 11 followed by those near Calgary and Red Deer. At the same time dairy herds in the northern parts of the province increased in size by 71 per cent from 2.8 animals in 1921 to 4.8 in 1961. Southern herds have grown from 2.4 animals to 4.0 in the same period; a smaller increase of 66 per cent.

10. The Census of Population and Agriculture of the Northwest Provinces 1906 (Ottawa, King's Printer, 1907) indicates that southern herds were comprised of 2.8 animals and that larger ones of 4.2 and 3.7 cows were located near Calgary and Edmonton. The 42 farms in the Peace River district reported over 14 cows per herd.

SUMMARY

Increased competition has led many farmers to specialize in specific agricultural pursuits in order that they may realize the economies of large scale operations. Improvement in cow breeding and herd management, and increases in the size of dairy herd and production per cow indicate that specialization is most noticeable in the fluid milksheds surrounding the major cities of the province and in the more northerly sections of Alberta.

CHAPTER IV

THE DISTRIBUTION AND CHARACTER OF DAIRYING IN ALBERTA

The past and present distribution and character of agricultural activity in Alberta has been shaped by events in the history of settlement, the physical environment, economic developments, and individual preferences of farmers. An analysis of some of these factors and the way in which they have influenced the dairy industry may indicate both the relative importance of each, and why dairying varies in its degree of importance in the divers parts of the province.

The current distribution of dairy farming was established in the early stages of settlement in Alberta. A brief examination of some of the events in the history of settlement before discussing the present distribution of dairy cattle and milk production may increase our comprehension of these patterns.

EVENTS IN THE HISTORY OF SETTLEMENT

Prior to the acquisition of Rupert's Land by Canada, in 1870, agricultural settlement there was generally an extension of the fur trade and was situated near trading posts. After 1871 the Homestead Act made it possible for anyone to settle almost anywhere with the exception of certain reserves set aside for Indians and the Hudson's Bay Company and in school and railway grants. Settlers tended to farm near the Canadian

Pacific Railway line which for numerous reasons, mostly of a political nature, was built in the more arid parts of the prairie. Settlement spread outwards from the railway and in southern Alberta homesteaders began to compete with ranchers for what was essentially rangeland.¹ This brought about an incipient overpopulation which was corrected later with a redistribution of population and expansion of irrigation. Because there were few barriers to northward expansion, settlers began to move in that direction very early in the history of the province. One of the most frequently used routes into the central and northern part of Alberta was the Calgary-Edmonton trail. In 1891 an extension of the Canadian Pacific Railway built parallel to this trail opened new markets in the south of the province and in British Columbia for farmers in these more northerly districts.

J. P. Sackville noted that the cattle associated with the initial settlement of Alberta were dual purpose.² Settlers likely had every intention of engaging in commercial agriculture but in the absence of adequate techniques for distributing milk they were forced instead to supply their own needs and possibly those of others within the immediate vicinity. Therefore many farmers needed and in fact, possessed dairy

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1. H. A. L. Strange, A Short History of Prairie Agriculture, Winnipeg, 1954, p. 14.
 2. J. P. Sackville, Dual Purpose Cattle, Bulletins of the Faculty of Agriculture, University of Alberta, No. 47, Edmonton, 1947, p. 1.

cattle. Dual purpose animals suited their purposes admirably because they provided both sufficient quantities of milk and beef calves of fairly high quality each year.

In many years a surplus of dairy or farm butter was manufactured on the farm and sold in local urban places. This was likely the forerunner of commercial dairying in Alberta. The first two dairy factories, which were established in 1888 and 1889, were located not far from Calgary, to take advantage of surplus milk production on farms in the area and the potential market offered by this city. Calgary was a rail centre by this date and dairy products which could not be sold in the city could be sent to markets in British Columbia. Both dairy concerns failed because they were unable to achieve a sufficient volume of raw product,³ but they likely encouraged local farmers to seriously consider dairying as a profitable agricultural enterprise. (It is interesting to note that manufacturers often built dairy processing plants in Alberta in anticipation of increased milk production, not because of it.)

At the same time "...In the Edmonton area...the first attempts at farming had been confined largely to grain growing....⁴ But surplus butter production was soon in excess of that required by the small Edmonton community and the local

3. C. F. Prevey, The Development of the Dairy Industry in Alberta, Unpublished M.A. Thesis, 1950, University of Toronto, p. 20.

4. The Alberta Dairymen's Association, Coming of Age, 1940, Edmonton, p. 32.

newspaper, the Edmonton Bulletin, began agitating for the construction of a creamery to produce butter for the market in British Columbia."⁵ The lack of a rail connection with Calgary until 1891 was possibly the prime reason that this proposed creamery was not built, because Edmonton processors would have been burdened with slow and expensive modes of transportation. Cochrane, however, was located on the Canadian Pacific Railway line just west of Calgary, in the Bow River valley, and it was here that Alberta's first creamery was built in 1891. Three creameries were built in the Edmonton area in the next year, just one year after the Edmonton-Calgary railway line was built by the Canadian Pacific Railway.

Most of these events initially favoured dairy producers and processors in the more southerly portions of the province, but as settlement proceeded and transportation facilities increased, dairying quickly became more important farther north. The difference between these two areas became especially noticeable during the latter part of the thirties when both dairy cattle numbers and milk production declined in the south because of economic depression coupled with drought (Maps 4 and 5). Under these difficult conditions farmers accepted free transportation provided by the federal government both for themselves and their cattle, and left the area. Often half-starved livestock were sold to the provincial and federal

5. Loc.cit.

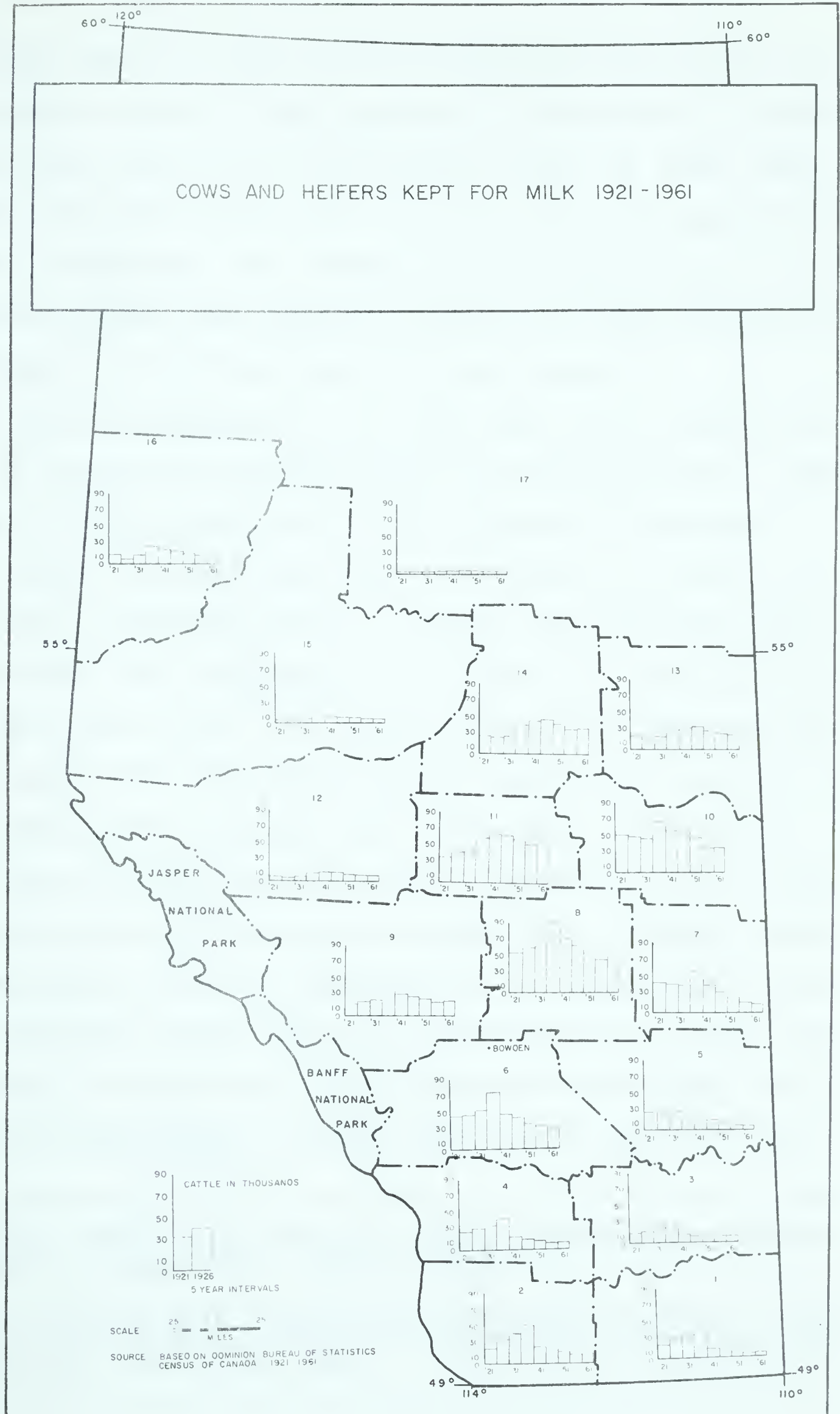
governments under the Optional Marketing Policy⁶ and the government in turn, moved these animals farther north into central Alberta where there were feed surpluses. The fact that farmers in central Alberta were able to absorb these additional animals is noteworthy because it is an indication that this area is physically better suited to dairying than most areas farther south. Although the cow population declined everywhere in the province as a result of increasing specialization it dropped precipitously in most southern census divisions because of an absolute decline in dairying. This industry never regained its former prominence in southern Alberta because local population losses resulted in smaller urban markets for milk and there were fewer farmers maintaining a subsistent type of dairy production involving one or two cows. Dairying, however, did remain fairly important in the irrigation districts because legumes are important in the crop rotation and they can be marketed through dairy cattle as milk or cream.

Rural population did not decline farther north in Alberta until the second world war when increasing mechanization made farm amalgamation possible and encouraged agricultural specialization. Dairying nevertheless remained an integral part of the mixed farming economy throughout this period of consolidation.

As the tempo of specialization increased after the war,

6. Alberta. Department of Agriculture, Annual Report, 1937, Edmonton, pp. 30-31.

Map 4



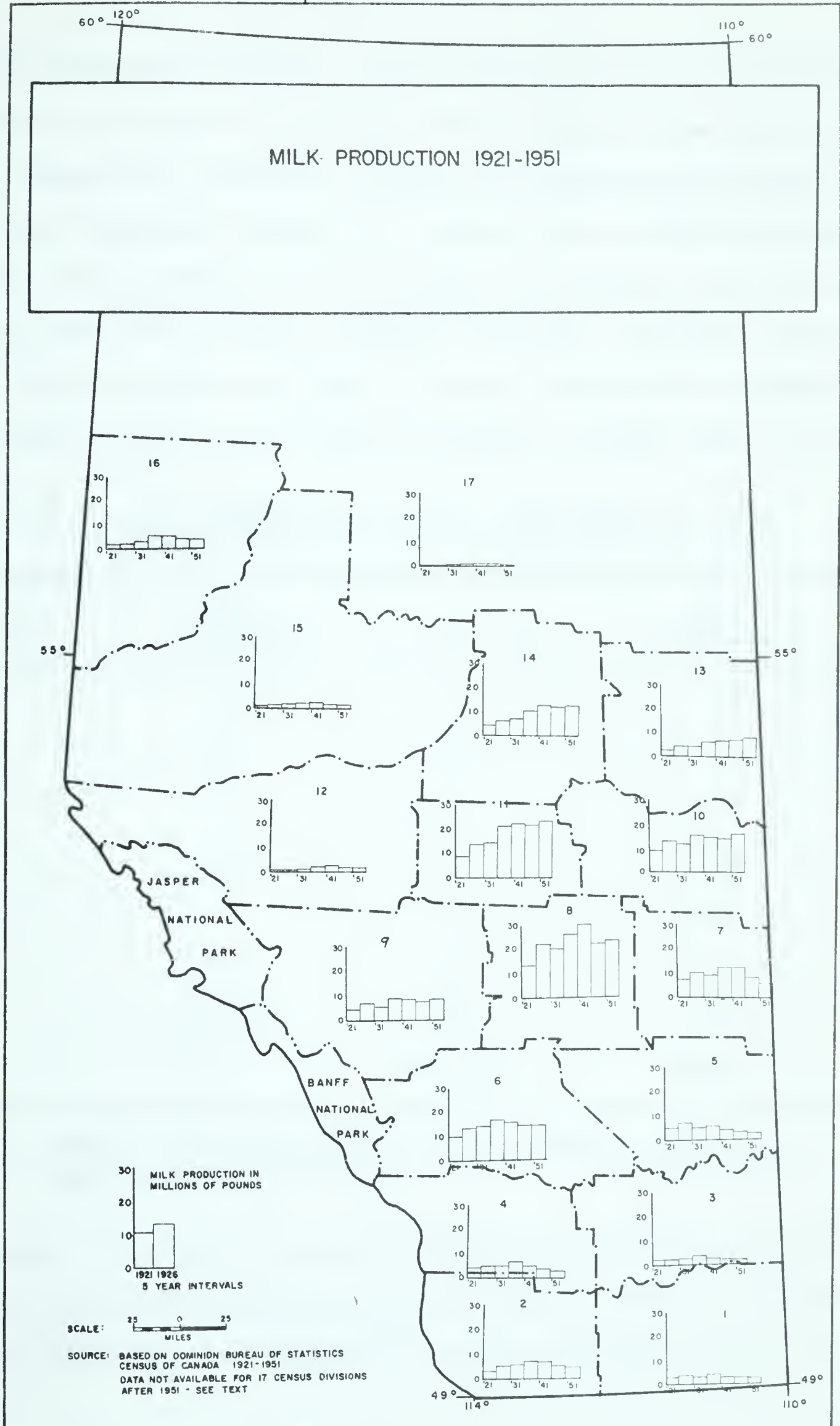
the total number of dairy cattle dropped but milk output has continued to expand. Milk production is important in central and northern Alberta not just because there are large urban markets here but because many parts of this area are physically suited to dairying. For example, 85 per cent of the 14 million pounds of butter sold outside of Alberta in 1962 originated in the central and northern parts of the province.⁷

Continued depopulation of rural areas and a tendency toward an accelerated urbanization of population, often at the expense of minor urban centres is currently in progress.⁸ Major urban concentrations have grown rapidly in the last 15 years but at differing rates, so that, areas with the greatest population at the beginning of the period often grew more rapidly than other areas with smaller population concentrations. For example, the 1951 populations of Edmonton and Calgary were approximately 170 thousand and 129 thousand respectively. In 1961 the population had increased in these two cities by approximately 88 and 93 per cent respectively. Farther south, in the smaller cities of Medicine Hat and Lethbridge, population increases between 1951 and 1961 were 50 and 55 per cent resulting in populations of approximately 24 thousand and 35 thousand respectively. Initial size has not been the only

7. Pers. comm., D. H. McCallum, Dairy Commissioner, Alberta Dept. of Agriculture, Dairy Branch.

8. Over 51 per cent of the total population in Alberta lived on farms in 1931. By 1961 the rural farm population had declined to 21.6 per cent.

Map 5



factor influencing growth. In 1951 the population of Red Deer was only 7,575 but it increased 259 per cent in the next decade. Changes in population numbers and distribution appear to favour the dairy industry in central and northern Alberta because local markets are increasing for the most part, at a greater rate here, than in southern Alberta. Locally there is some indication that dairying is again increasing in importance on irrigated land in the south (see Map 5, Table XII). It is

Table XII Milk Production in '000,000 Pounds for the
Month of May 1961 for 15 Census Divisions.

Division	Milk Production	Division	Milk Production
1	2.9	9	0.2
2	8.7	10	23.5
3	3.6	11	36.7
4	2.0	12	8.6
5	5.5	13	16.0
6	14.0	14	1.6
7	10.0	15	6.7
8	22.0	Province	162.6

Source: Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.

difficult, however, to discern whether the apparent increases in milk production are in fact real or are linked to changes in the boundaries and numbers of census divisions after 1951.

Comparing divisions 1 to 6 on the map as a unit with the same divisions in Table XII suggests the increases are real. The northern boundary of this group of divisions is approximately the same before and after 1951, therefore the area is also similar. Milk production in these six divisions has risen from almost 29 million pounds in 1951 to 36.7 million in 1961. Field checks suggest that most of this increase was experienced within the boundaries of the current limits of division 2 where a major proportion of the St. Mary-Milk Rivers and Eastern irrigation districts are located.

Summary of the Historical Development

In the early stages of development dairying was likely a common feature of most agricultural enterprises throughout Alberta because farmers tended to be self sufficient in many agricultural commodities. In the absence of rapid communications dairy products often were not available through regular commercial channels so settlers often supplied their own needs. In 1916, the first year in which the number of farms with milk cows was reported, 74 per cent of all census farms reported cows kept for milk. As communications improved and changes in agricultural technology resulted in increased specialization, this figure declined consistently, except during the thirties, to 61 per cent in 1961.

Some of the first examples of commercial dairying and dairy processing were to be found in southern Alberta because in many cases they were favoured by railway connections to

to markets. This advantage over the rest of Alberta was short-lived and with increased population and improved transportation facilities farmers in the central and northern parts of the province took precedence in commercial dairying.

Cost of production is becoming a major factor in the location of the dairy industry because improvement in transportation facilities and bulk milk shipments tend to reduce the effect of distance to market. Therefore milk production in areas which are suited to dairying in terms of physiography and climate will likely increase in volume. Although the distribution of milk production for manufactured dairy products is fairly rational in that it coincides with conditions more conducive to dairying than to many other agricultural pursuits, specialized production of fluid milk for human consumption is more closely allied with markets, often in spite of physical conditions. As was stated previously the location of fluid milk producers in proximity to the rapidly growing urban centres of Alberta is not a reflection of economic conditions alone because there are provincial laws restricting unlimited movement of milk destined for human consumption.

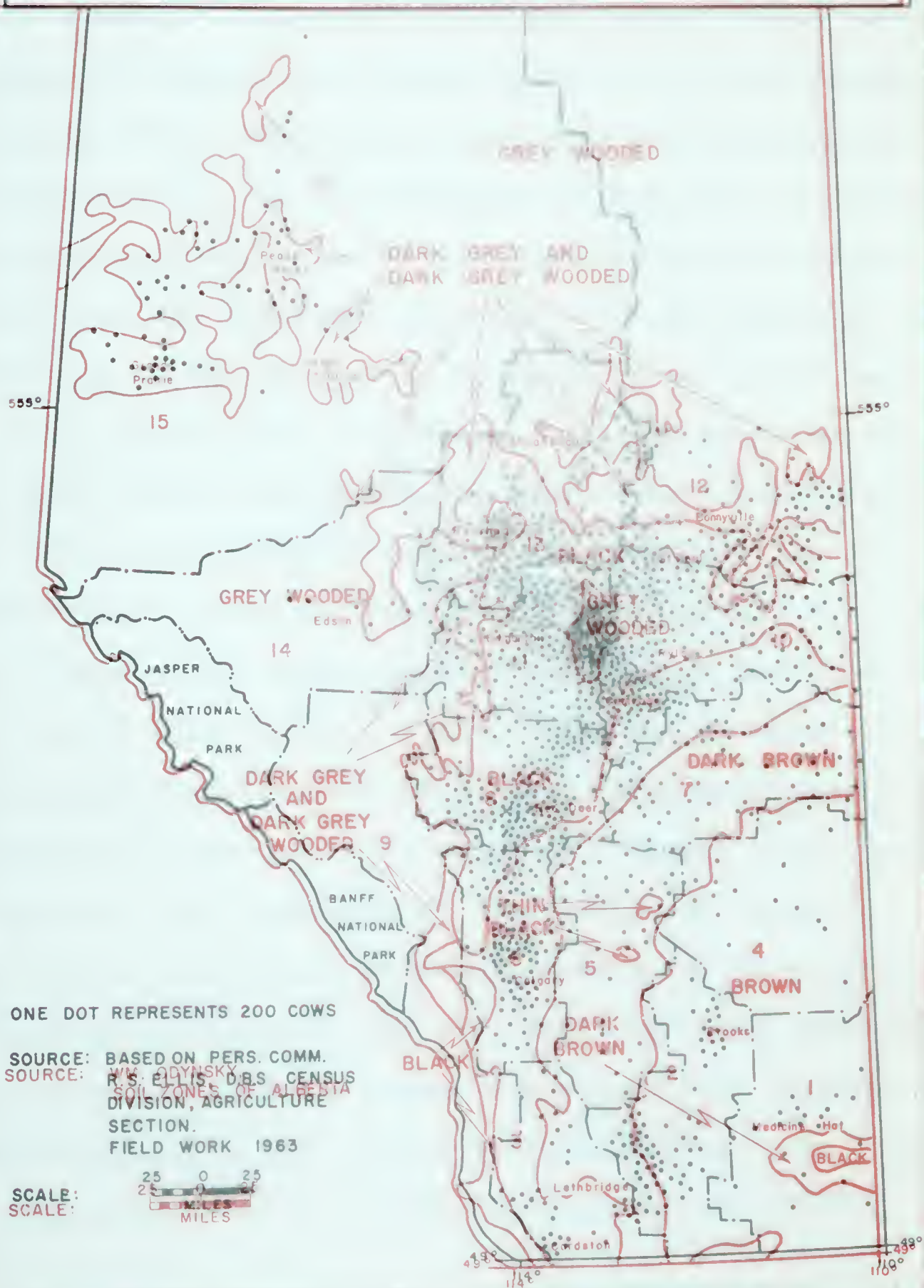
PRESENT DISTRIBUTION OF DAIRY CATTLE - 1961

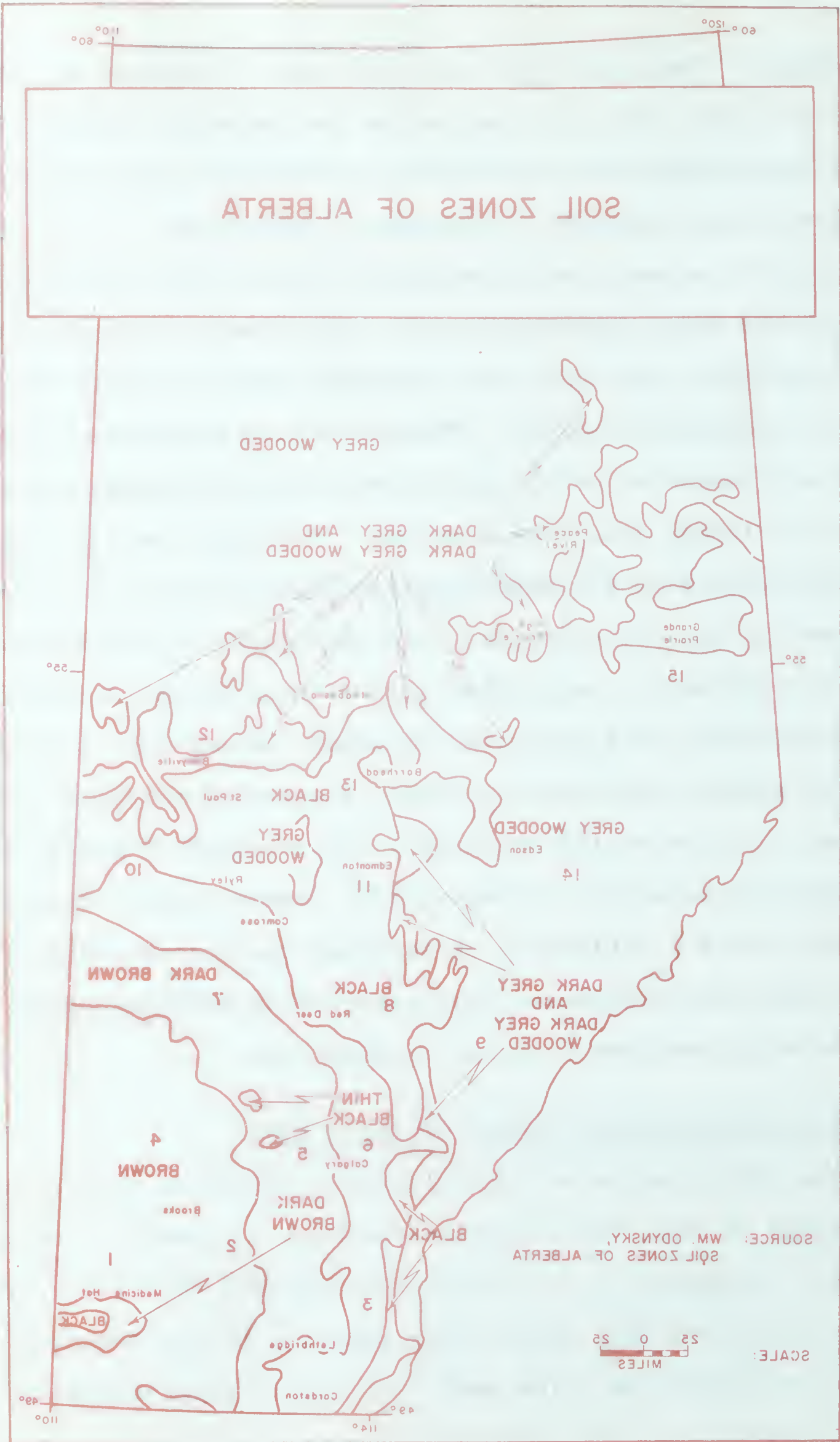
The distribution of dairy cattle is shown on Map 6. In an attempt to show this distribution with reasonable accuracy each dot represents a relatively small number of cattle. The map was based on 1961 census data supplied by the Dominion Bureau of Statistics. The number of census reporting units

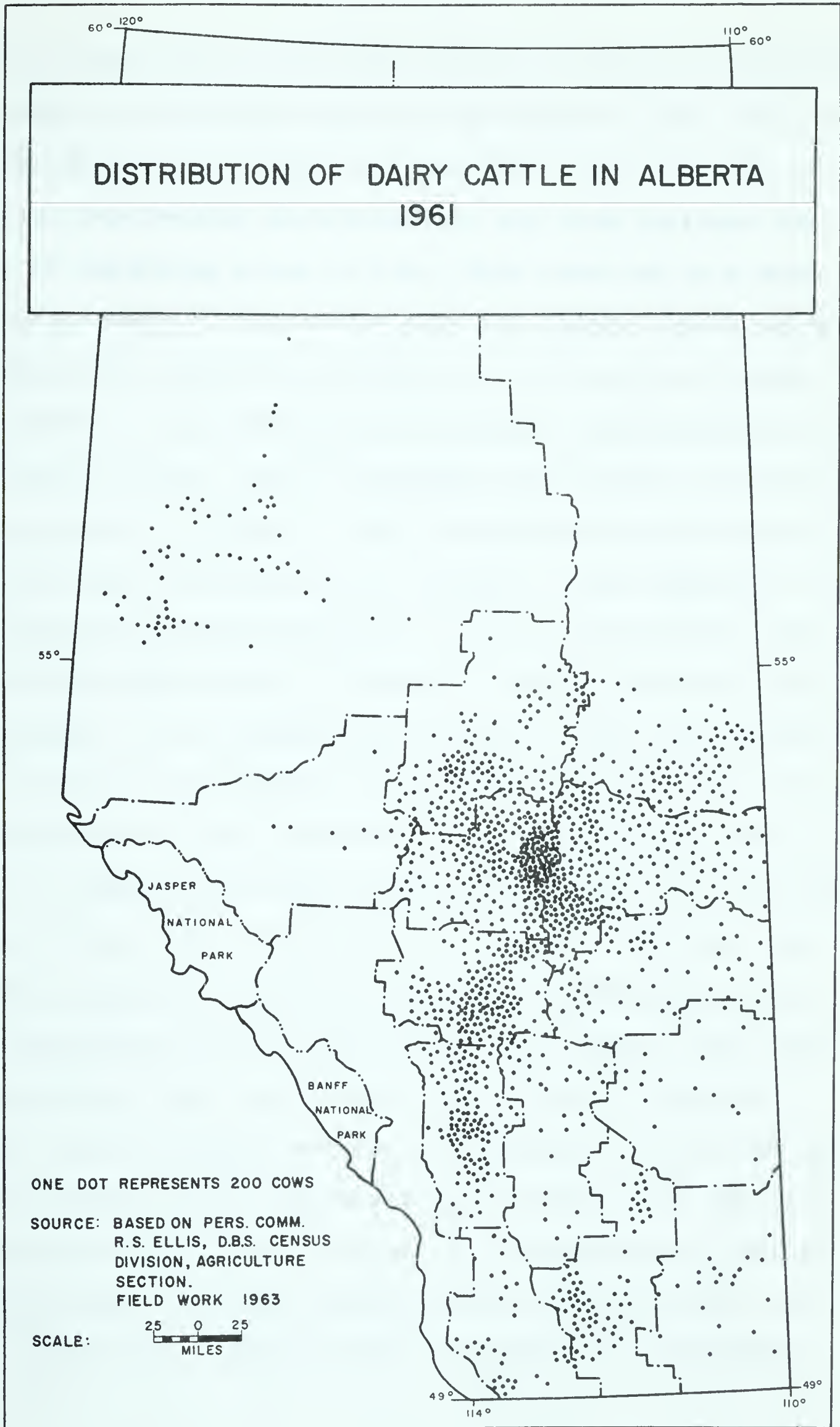
DISTRIBUTION OF DAIRY CATTLE IN ALBERTA

SOIL ZONES OF ALBERTA

1961







was 94 in 1961, but by grouping specific enumeration districts, the number of reporting areas was increased to 152. The author was able to subdivide larger census units, such as, counties, improvement districts etc. and thus increase the number of reporting areas to 152. This resulted in a more precise positioning of the dots within the larger census units. The geographic locations of these data were refined further with the aid of maps depicting population concentrations, irrigation districts, and the milksheds of all milk or cream processing plants in Alberta. The information for this latter series of maps was collected and mapped in the summer of 1962.

Dairying is most prevalent in an arc from Nanton, approximately fifty miles south of Calgary, north to Edmonton then roughly east to the Saskatchewan border. This concentration of dairy cattle is coincident for the most part with the extremely fertile black soils and the most densely settled part of Alberta. Markets for dairy produce are largest here and the area is served with a fine network of roads. Physical and economic conditions are such that mixed farming has proven to be profitable and therefore there is a larger rural population density here than in most other parts of Alberta. Service centres which have been developed to satisfy the needs of these people and to process and distribute milk and milk products provide in turn a market for the produce of the surrounding farms. The two largest urban concentrations, Calgary and Edmonton, occur in this arc and have surrounding

them, strong concentrations of specialized dairy farms producing fluid milk. The distribution of dairy cows outside the major concentrations is arrested abruptly to the west because of the less favourable conditions for agricultural settlement. This rolling, forested area is more humid because elevation and rainfall increase to the west. The resultant climate and biotic factors have led to the development of largely infertile grey wooded soils. Settlement has lagged in the more suitable areas due to the problems of land clearing and the less than optimum fertility of the soils, but once populated this area will likely gain increasing importance as a dairying and beef region, since grass and legumes are necessary in the crop rotation to maintain the limited fertility of the soil. The same general soil characteristics are encountered in divisions 12, 13, and 14 to the north of the major concentration of cows, but drier climatic conditions and slightly longer growing and frost free periods prevail on the average because of lower elevations.

The Peace River district has a broad scattering of mixed breed cows, interspersed with small areas which contain a higher percentage of grade Holsteins. The mixed breed cows are kept to supply home milk needs with surplus cream going to local creameries, while the well bred Holsteins are used to a large extent for fluid milk sales in the urban settlements.

There are other, minor, concentrations of dairy cows located for the most part in southern irrigation districts (see

Map 6). The most important of these is located near Lethbridge in the Magrath, Raymond, Western St. Mary and Milk Rivers and Lethbridge Northern irrigation districts. The other areas in descending order of importance are the Eastern Irrigation district surrounding the town of Brooks, the United, Mountain View, and Aetna irrigation districts around Glenwoodville and Cardston, and the eastern part of the St. Mary and Milk Rivers projects and the Ross Creek irrigation district which are situated close to Medicine Hat. Farmers in these districts supply southern markets, and small surpluses of butter are sold outside of the area.

PHYSICAL VARIABLES AND THE INCIDENCE OF DAIRYING

At any particular stage in the evolution of agricultural technology the physical environment appears to place some restriction upon the number of ways that a farmer may choose to utilize his land. In some limited instances, however, it may be economic to modify the physical environment because transportation costs are prohibitive for a specific commodity which is in great demand. The forms that this modification takes are varied but two examples might be land levelling for irrigation and the construction of hothouses on the peripheries of major urban markets. Milk production for direct human consumption has traditionally taken place in the immediate vicinity of urban markets, not because of the physical environment but rather because of the high cost of transporting fluid milk. Nevertheless, the location of dairying in Alberta,

with the exception of fluid milk production for human consumption, reflects to a large degree the influence of the physical environment. As transportation costs for milk continue to decline, as they have done in the past few years, the future expansion of dairying will perhaps be even more rational with reference to the physical environment.⁹

Perhaps one of the most striking features of the distribution of dairying is that the intensity of dairy production varies considerably in the various generalized soil zones of Alberta (see overlay on Map 6). Although the area of the black soil zone is only 18 per cent, or 8 million acres¹⁰ of total occupied farm land in all soil zones in Alberta, 50 per cent of all cows kept for milk in 1961 are situated here (Table XIII). If cows located on thin black soils are added to those situated on the chernozem or black soils then the number of cows as a percentage of the total cow population in Alberta increases to 70 per cent. The larger zones of dark brown and brown soil

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9. Pers. comm., W. Magrath, Alberta, Dept. of Agriculture, Dairy Branch. A recent study carried out by the Dairy Branch of the provincial Dept. of Agriculture indicates that transportation costs for industrial milk for cheese have declined 60 per cent in the last ten years. One major dairy company reports a substantial decrease in transportation rates for fluid milk for human consumption in the last six or seven years because bulk milk tanks have reduced handling costs and allow larger consignments of milk to be shipped less often. Freight rates between Edmonton and Vancouver for finished dairy products have declined over 60 per cent in the last 15 years, in part because of the increased competition between railroads and trucking firms.
10. W. Odymsky, Soil Zones of Alberta, 3rd ed. rev., Edmonton, 1962.

Table XIII Dairy Cows Expressed as a Percentage of
Total Cow Numbers for Five Soil Zones - 1961.

Soil Zones	Black	Thin Black	Dark Brown	Brown	Grey Wooded
Cows	50	20	10	5	15

Source: Based on statistics from: Pers. comm., R. Ellis, Chief of Agricultural Section, Dominion Bureau of Statistics.

account for only 15 per cent of the total number of cows and, as stated previously, most of these animals are found in the irrigation districts where the physical environment has undergone fairly intensive modification. The last major soil zone, the grey wooded soils, is potentially the largest agricultural area of the province but due to its special character which renders it marginal for many agricultural enterprises settlement has proceeded slowly. Therefore only approximately 8 million acres of the total 15 million acres of potentially arable land are settled. Farmers in this area maintain only 15 per cent of total provincial dairy cow numbers. These generalized soil zones are among other things soil moisture zones.¹¹ They reflect the thermal and moisture regimen and indicate those areas best suited to the production of specific crops.

There appear to be few physical factors limiting the distribution of dairy cows in Alberta, other than the distribution of moisture. Fielding suggested that a mean monthly

11. H. L. Patterson, Dairy Farm Business in Alberta, 1939-1943, Bulletins of the Canada Dept. of Agriculture, No. 812, Ottawa, 1948, p. 72.

maximum temperature of 90°F is the maximum at which dairying utilizing temperate breeds can operate efficiently.¹² Temperatures above this figure result in reduced yields per cow. The highest monthly maximum 20 years mean temperature reported in Alberta is 83°F at Medicine Hat in southern Alberta. It might be expected that winter temperatures affect the physical well being of dairy cattle and thus limit their distribution. The average January minimum and maximum temperatures, expressed in Fahrenheit degrees, for Medicine Hat, Lethbridge, Edmonton and Beaverlodge are 1.8 and 22.4, 7.2 and 27.3, -2.0 and 15.2, and -1.2 and 15.9.¹³ But the number of cows per acre of farmland is highest in central and northern Alberta where the lower temperatures are experienced, and the use of open or loose housing, in which decomposing manure provides the only outside source of heat, appears to be just as common in the northernmost settled parts of the Peace River district as in dairy districts much farther south.

The effect of soil moisture on the distribution of dairying is expressed to a large degree through vegetation. Dairy cows utilize fairly high quality pasture which must be located in close proximity to the milking facilities of the farm. Patterson noted that cows are seldom grazed on land over three-quarters of a mile from the barn because they must return to be milked twice a day.¹⁴ Therefore where the carrying capacity

12. G.J.Fielding, Dairying in the Los Angeles Milkshed; Factors Affecting Character and Location, unpublished Ph.D. thesis, University of California, (Los Angeles), Los Angeles, 1961, p.89.

13. H. L. Patterson, op.cit., p. 73.

14. Canada. Dept. of Transport, Climatology Division, Meteorological Branch, Temperature Normals for Alberta, Toronto, 1964.

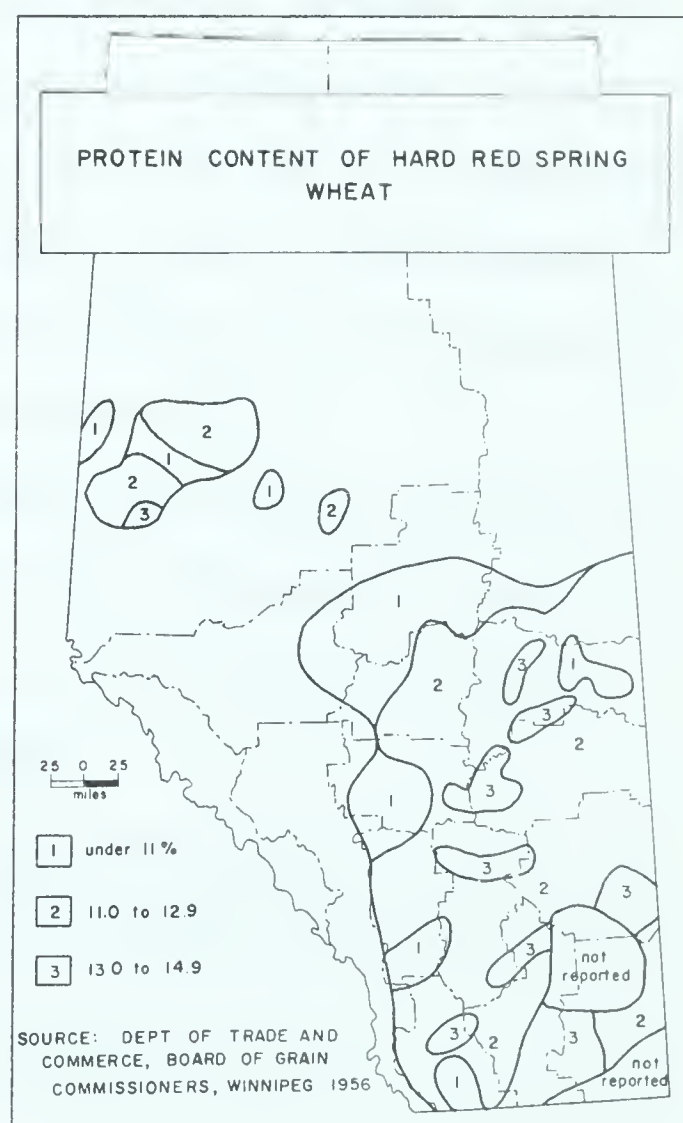
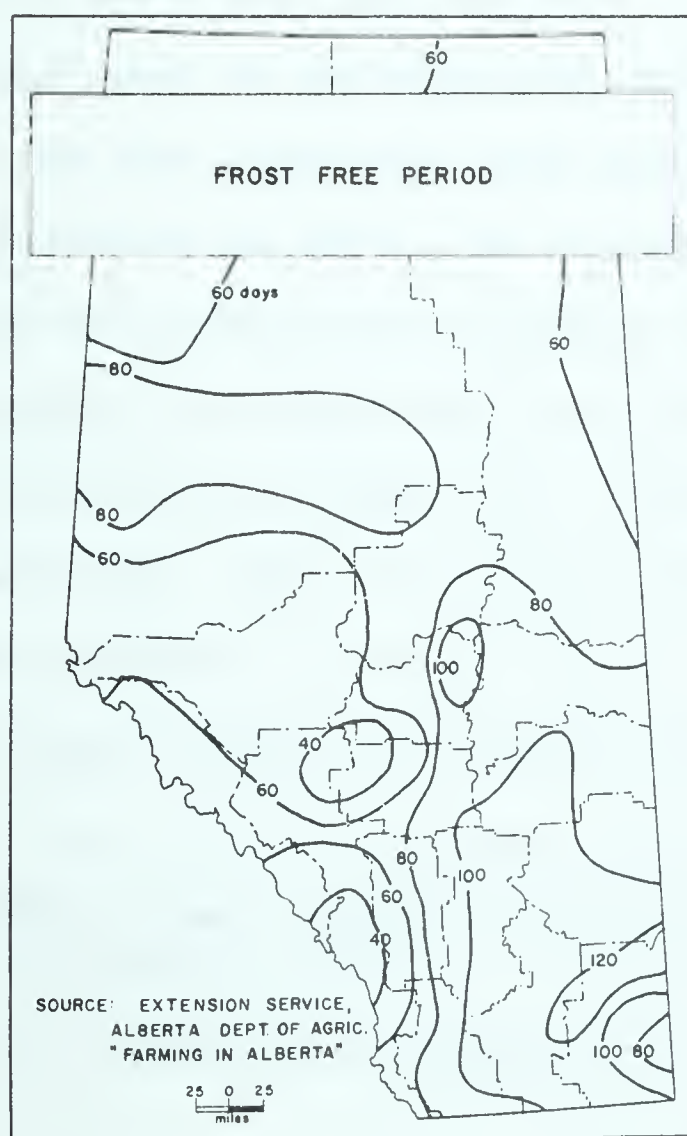
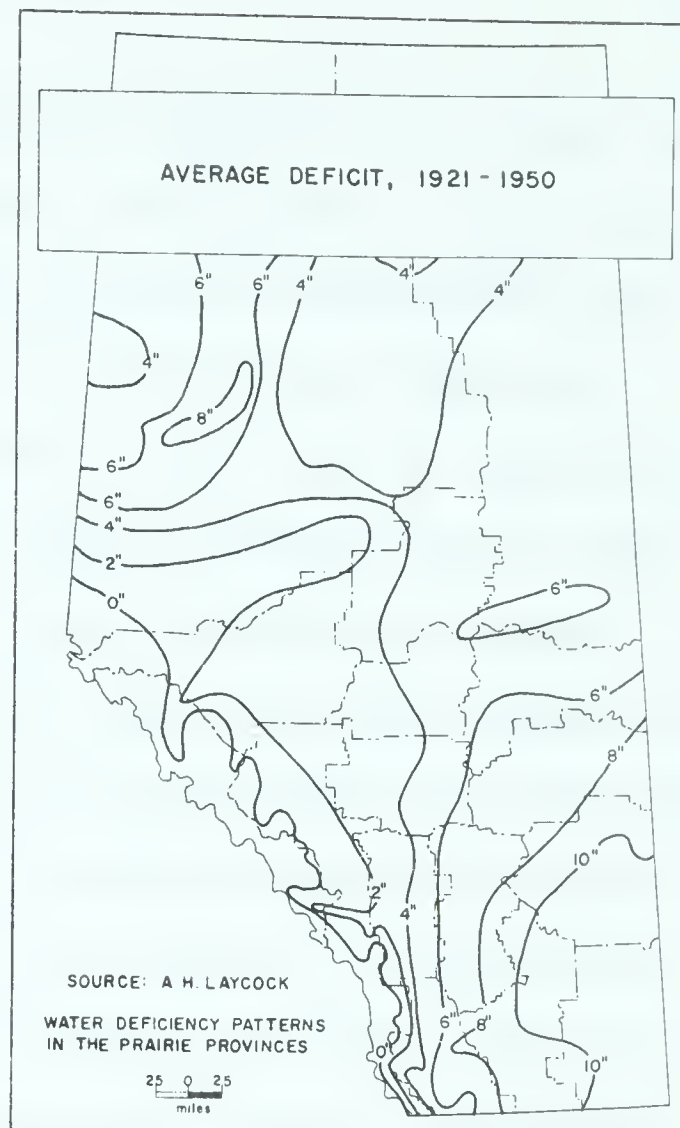
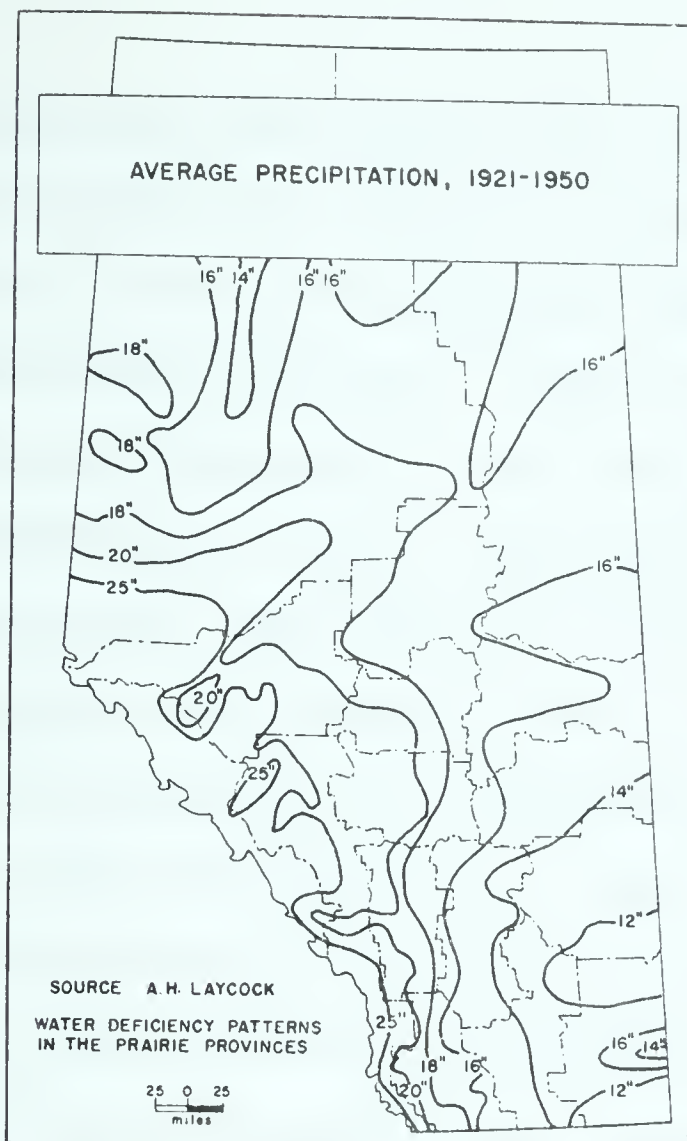
of any rangeland is low because of scant rainfall, then this land will likely be used for beef production because it cannot be profitably utilized by dairy cattle. Soil moisture also influences the type of crop grown in the soil zones of Alberta. Different plants utilize moisture with varying degrees of efficiency so that different weights of dry matter are produced for each pound of water consumed. Wheat and oats require on the average 403 and 536 pounds of moisture for every pound of dry matter produced whereas brome grass, alfalfa and crested wheat grass need 784, 798 and 806 pounds of water per pound of dry matter produced. This means that in areas with low rainfall and a high incidence of drought (Maps 7A and 7B) wheat and oats utilize available moisture more effectively than forage crops and therefore are more likely to be grown than other kinds of plants. Neatby and McCalla¹⁴ have demonstrated that there is an inverse relationship between effective precipitation and quality of hard wheat. In a study carried out in the period from 1931 to 1937 the protein content of wheat, the best single measure of quality, varied considerably between each soil zone. For example, the best grades of wheat with a protein content of more than 12 per cent are grown in the drier southern brown soil zone whereas inferior grades are grown under more humid conditions farther north in the black and grey wooded soil zones. The protein content of

14. K. W. Neatby and A. G. McCalla, The Production and Quality of Cereal Crops in the Park and Wooded Areas of Alberta, Bulletins of the Faculty of Agriculture, University of Alberta, No. 30, Edmonton, 1938, p. 18.

wheat was less than 11 per cent on the grey wooded soils and transitional black soils west of Red Deer and west and north of Edmonton during half of the study period. Wheat was of higher quality in the Peace River district but not as high as that produced in the southern brown zone. For example, protein content was more than 11 per cent in six years of the study period but over 12 per cent only once. The same general result was obtained by the federal Department of Trade and Commerce in 1956 and is shown on Map 7D. Although wheat yields per acre are often higher in the more humid zones the lower quality of the grain discourages wheat production on a scale comparable to that encountered in the drier parts of the province. A more intensive kind of farming, in which there is a crop livestock combination, appears to be at an economic advantage. Dairy cattle are often the choice of livestock because receipts per animal unit are greater from dairy cows than beef¹⁵ and because dairy animals provide a more stable income than do hogs.

Quality of the soil and topography also influence the local distribution of dairying within the generalized soil zones. It is difficult to demonstrate their effect with statistical evidence collected on as broad a basis as a census division but there is a general tendency for unimproved farm land and an emphasis on livestock to occur together. For example, more than 65 per cent of land in farms was unimproved in 1961 in census divisions 1 and 4, and the major agricultural

15. H. L. Patterson, op.cit. p. 73.



pursuit was beef production. However although some of the lowest figures for unimproved farmland are reported in the vicinity of Red Deer and Edmonton these areas are coincident with the maximum densities of dairy cattle in Alberta (Map 6). This phenomenon may be related both to the stage of agricultural development and to the type of milk production which takes place here. Agriculture in these long established farming districts has advanced from an early stage in which unimproved land was used for milk production for cream sales and farm use to a more advanced form in which intensive commercial fluid milk production takes place on improved land.¹⁶ Nevertheless, local concentrations of dairying, especially if the cows are kept for cream production, portray a distribution which closely parallels the distribution of land which, because of poor quality soil or unfavourable drainage or topography, is unsuitable for intensive crop production. Patterson noted this relationship in 1943. He stated that, "one of the factors likely to affect concentration on dairying, is the amount of land which is unsuitable for cultivation".¹⁷

The risk of frost also influences the local distribution of dairying. Map 7C indicates the frost free period and provides a guide as to which areas are in the greatest danger from frost during the growing season.

16. Pers. comm., Questionnaire to all District Agriculturists in Alberta, 1963.

17. H. L. Patterson, op.cit., p. 75.

Production of grains, such as malting barley, that do well under humid conditions would likely be more prevalent in the grey wooded soil zone and in the northern parts of the black soil zone except for the danger of frost. Neatby and McCalla indicated that four degrees of frost during the growing season will reduce the milling qualities of wheat and lower the germination rate of malting barley.¹⁸ Grains exposed to severe frost are graded lower or are accepted only as feed grain commercially. Farmers faced with these conditions will often elect to feed their own grains and market them as beef or dairy produce. The production of legumes is favoured because they are not as susceptible to frost damage as grain crops. Many areas north of Edmonton in census division 13 lie in the transition zone between the isorhythms depicting 60 and 80 frost free days. The protein content of wheat from this division is low because of fairly abundant rainfall, and other grains are often of poor quality because of their exposure to frost. These conditions allow livestock production to compete favourably with other kinds of farming. Examples of the effect of frost are difficult to show statistically because of its erratic nature and local occurrence. However district agriculturists and dairy plant managers in this area and farther east near Lac La Biche suggested, when interviewed, that frost played a significant part in the location and importance of dairying in their administrative or business

18. K. W. Neatby and A. G. McCalla, op.cit., p. 22.

districts.

Moisture condition appears to be the most important positive physical variable affecting the distribution of dairying. The other physical conditions are of a more negative character in that other kinds of farming operate under some handicap thus often making dairying a more attractive farming alternative. But these variables still operate within the framework of the history of settlement. If the location of dairying was based upon physical factors alone then the major milk producing areas would likely be located in the grey wooded soil zone. However settlement proceeded most rapidly in the black soil zone because precipitation is adequate for most crops and more importantly there were large areas of open grassland which simplified the preparation of the land for agriculture. Once commercial dairying had become established a shift to areas of lower production costs became increasingly difficult because large amounts of capital had been expended in the initial development and maintenance of the industry.

CHARACTERISTICS OF DAIRYING IN THE GENERALIZED SOIL ZONES

An examination of the various characteristics of dairying, such as trends and seasonality of production and the way in which milk output is utilized, offers some indication of the role that milk production plays in the local farm economy.

Trends in Milk Production in Each Soil Zone

Farmers in central and northern Alberta are producing an increasingly larger proportion of Alberta's total milk output

whereas milk production is growing at a slower pace in the south. The shift in the relative importance of this commodity in each area can be demonstrated by plotting milk production for the three major soil zones in Alberta. Table XIV illustrates the trend in milk production from 1926 to 1961 for three groups of census divisions which best depict the grey wooded, black and thin black and the dark brown and brown soil zones.¹⁹

Table XIV Milk Production Expressed as a Percentage of
Total Milk Production for Three Major Soil
Zones, 1926-61 *

	1926	1931	1936	1941	1946	1951	1956	1961
Brown	29	29	27	23	20	18	19	18
Black	52	54	54	54	55	55	56	58
Grey Wooded	19	17	19	23	25	27	25	24

Source: Based on Canada. Dominion Bureau of Statistics, Census of Canada, 1921-1961, Ottawa.

* The data has been smoothed by the use of a two year floating mean.

These census divisions do not coincide exactly with the distribution of the various soils and therefore the trend for each soil zone is not as accurate as it might be if data were available for a smaller reporting unit. Furthermore, the continuity of each trend was broken in 1956, especially for the black

19. Present day census divisions 6, 8, 10 and most of 11 are accepted as representing the black soil zones; 1, 2, 3, 4, 5, and 7 are roughly coincident with the brown soils and the remaining divisions best depict the grey wooded soils.

and grey wooded soil zones, because all of the census divisions in Alberta were shifted slightly in their geographic location and reduced in number after 1951. However additional evidence is offered later which may indicate that the change in trend in 1956 is, in fact, attributable to factors other than the relocation of municipal boundaries alone.

Milk production has been slowly declining in the brown soil zone (Map 5 and Tables XII and XIV) and it is only recently that real increases in productivity have been experienced on irrigated land in proximity to Calgary and Lethbridge. Dairy producers on black soils have increased their milk output from 1921 to 1956 at the same rate at which total provincial milk output has increased so that they have contributed a constant proportion to the total provincial milk output. After 1956 however, increases in milk production in this area were more rapid than for the province as a whole so that farmers in this soil zone contributed a larger proportion of the total provincial milk output than previously. Milk production has generally increased from 1921 to 1961 in the grey wooded soil zone (Map 5 and Table XII) but in only one period, 1941 to 1951 (Table XIV) did milk output increase at a rate greater than the growth of provincial milk production.²⁰ It was to

20. This is difficult to see on Map 5 because although there was a general increase in milk production on the grey wooded soils it occurred only in those divisions located close to black soils. For example, milk production figures, when totalled for divisions 9, 13, and 14 for the years 1941 and 1951, indicate a slight increase although total provincial milk output actually decreased in this

this period that Patterson referred when he stated that "...the most rapid development in dairying in recent years has taken place on the grey [wooded] soils, close to the black soil zones".²¹ Although milk production is still generally increasing in this soil zone it is now doing so at a declining rate, even for those areas in proximity to black soils.

A Measure of the Importance of Dairying in Each Soil Zone

Although a distribution map of dairy cows may indicate which parts of Alberta produce the largest proportion of the province's total milk production (see Map 6) there is no way of ascertaining the importance of dairying to the total farm economy within any specific part of Alberta. A low density of dots in one part of the province might mean that there is a lack of interest in dairying because farmers are engaged in some other form of agricultural activity; on the other hand it could mean that although milk production is one of the main activities in a specific area farming generally is unimportant. Another measure which overcomes this deficiency is the proportion of the farmers who produce milk and the proportion of the farmers who produce milk and also sell it. The data contained in Table XV. indicate that 63 per cent of all farmers located on the black soils reported milk production in 1961.

period (Figure 1). This observation is reinforced by the increase in milk production reported for division 11 (Map 5). Most of this indicated increase likely occurred east of Edmonton on the grey wooded soils (overlay on Map 6).

21. H. L. Patterson, op.cit., p. 72.

Table XV The Number of Farms with Milk Production Expressed as a Percentage of Total Farms - and - The Number of Farms Reporting Milk or Cream Sales Expressed as a Percentage of the Number of Farms with Milk Production in each Census Division and in Three Generalized Soil Zones - 1961

Soil Zone	Division	Percentage of Farms with Milk Production	Percentage of Farms with Milk Sales
Brown	1	48	62
	2	50	62
	3	49	65
	4	44	54
	5	41	63
	7	57	78
Per cent		48	66
Black	6	53	74
	8	64	87
	10	66	80
	11	65	87
Per cent		63	83
Grey Wooded	9	45	62
	12	67	73
	13	64	83
	14	55	75
	15	38	49
Per cent		53	69

Source: Based on: Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.

The figures for the brown and grey wooded soil zones are roughly 48 and 53 per cent. The percentage of farmers reporting both milk production and sales of milk or cream is lower in all census divisions than the percentage of farmers reporting only milk output because many farmers produce milk solely for their own use on the farm.

Milk producers appear most commercial in the black soil zone with 83 per cent of all farmers who reported milk production also reporting sales of dairy products. Sales are less important for farmers in the brown and grey wooded soils with 66 and 69 per cent of the farmers who produced milk also reporting sales. It appears therefore, that the zone in which the largest volume of milk is produced is also the zone in which the greatest amount of commercial dairying takes place. Commercial dairying is not as important in the other two generalized soil zones because markets are not as readily available. This type of dairying is beginning to increase in importance, however, especially within the last 15 years.

Uses of Milk in Each Soil Zone

Much of the milk produced in the brown soil zone is retained on the farm (Map 8) and divided almost equally between household uses and animal feed. The second major portion of the milk is sold as butterfat. Milk for this use is usually separated on the farm rather than at the local creamery and the residue, or skim milk, is most probably used as animal feed. This suggests that even more milk than is reported in

the censuses or shown on Map 8 is used as animal feed so that this use absorbs the largest proportion of all milk produced in the brown soil zone. Fluid milk sales are becoming more important in much of the area however, (see Table XVI and Map 8) because the major cities in this zone are increasing substantially in size. The pattern of milk use is different in census division 7 from that encountered in the southern brown soil areas and more closely approximates the pattern displayed on the more fertile soils in central and northern Alberta.

Almost all of the total milk output of farms in the black soil zone is sold. Census division 10 is the only area in this zone in which fairly large amounts of milk are retained for use on the farm. Sales of fluid milk are highest, of course, in those census divisions (6 and 11) in which Calgary and Edmonton are located. Fluid milk sales also have expanded appreciably in census division 8 (Table XVI) because the manufacture of dried and condensed milk is becoming increasingly important in Red Deer which is situated in this division.

The location of individual milk producing areas, with respect to markets affects the way in which farmers in the grey wooded soil zone dispose of their milk. Milk uses in division 9 are similar to those of division 8 because much of this area is within reach of the milk industries in Red Deer. For example, a large proportion of the total milk production is sold to local creameries and in Red Deer for the manufacture of butter and milk products. Only a very small

USES OF MILK IN ALBERTA EXPRESSED AS A PERCENTAGE OF
TOTAL MILK PRODUCTION 1921 - 1951

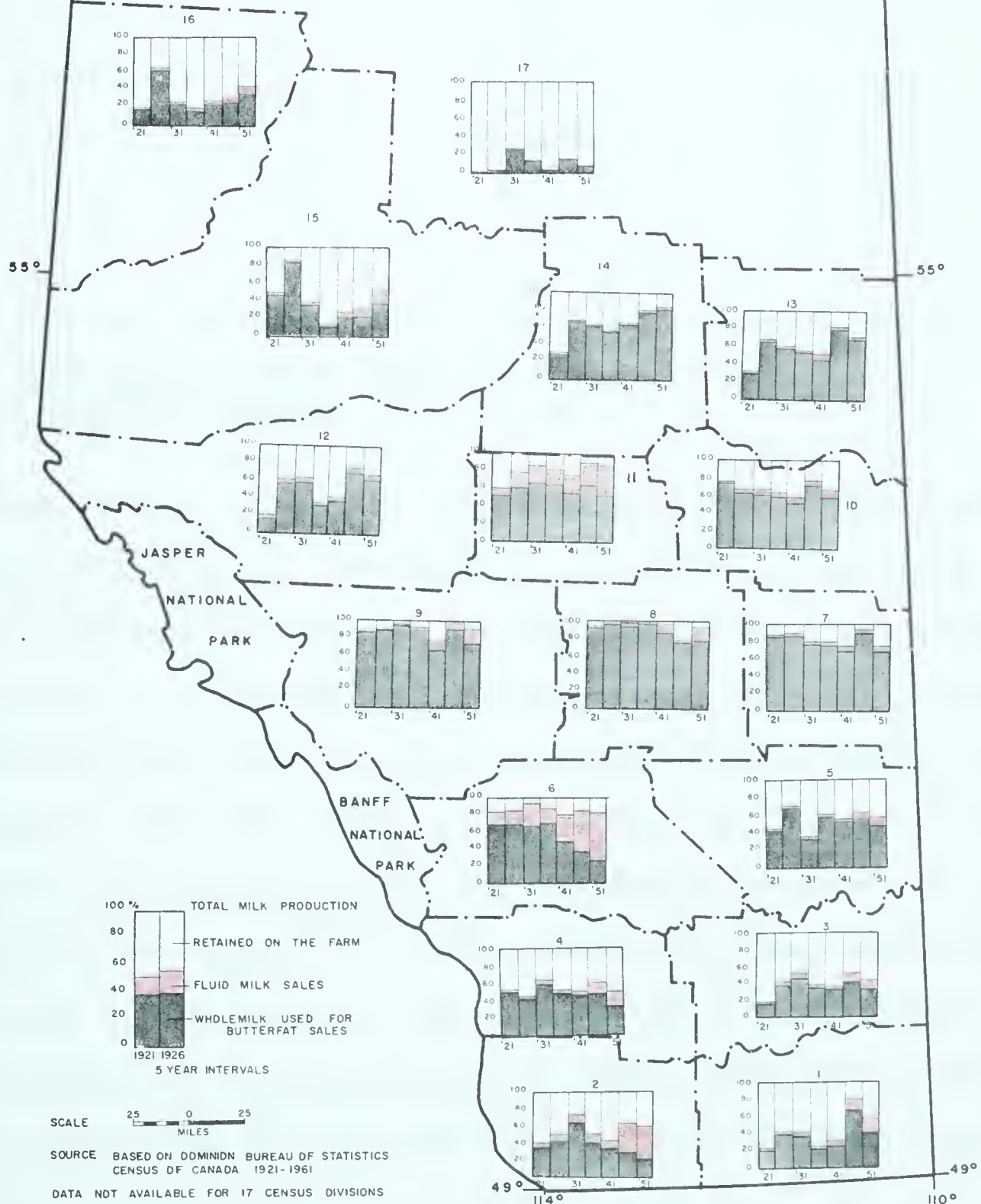


Table XVI Fluid Milk Sales Expressed as a Percentage
of Total Milk Produced in Each Census
Division - 1961

Division	Fluid Milk Sales	Division	Fluid Milk Sales
1	20	9	21
2	37	10	13
3	16	11	42
4	4	12	4
5	25	13	3
6	55	14	15
7	8	15	14
8	33		

Source: Based on: Canada. Dominion Bureau of Statistics,
Census of Canada, 1961, Ottawa.

proportion of the total milk output is retained on the farm. Farmers in division 9, like those in division 8, are channeling an increasing percentage of their milk into fluid milk sales. This use absorbed 16 per cent of the total milk output in 1951 and 21 per cent in 1961. Farther north in census divisions 13, 14, and after 1941, division 12, the pattern of milk utilization closely parallels that displayed for division 10. More milk is retained on the farm than is the case for division 9 and cream sales, primarily for the manufacture of butter, are the most important commercial use of milk. Milk production is largely unimportant in the remaining parts of the grey wooded

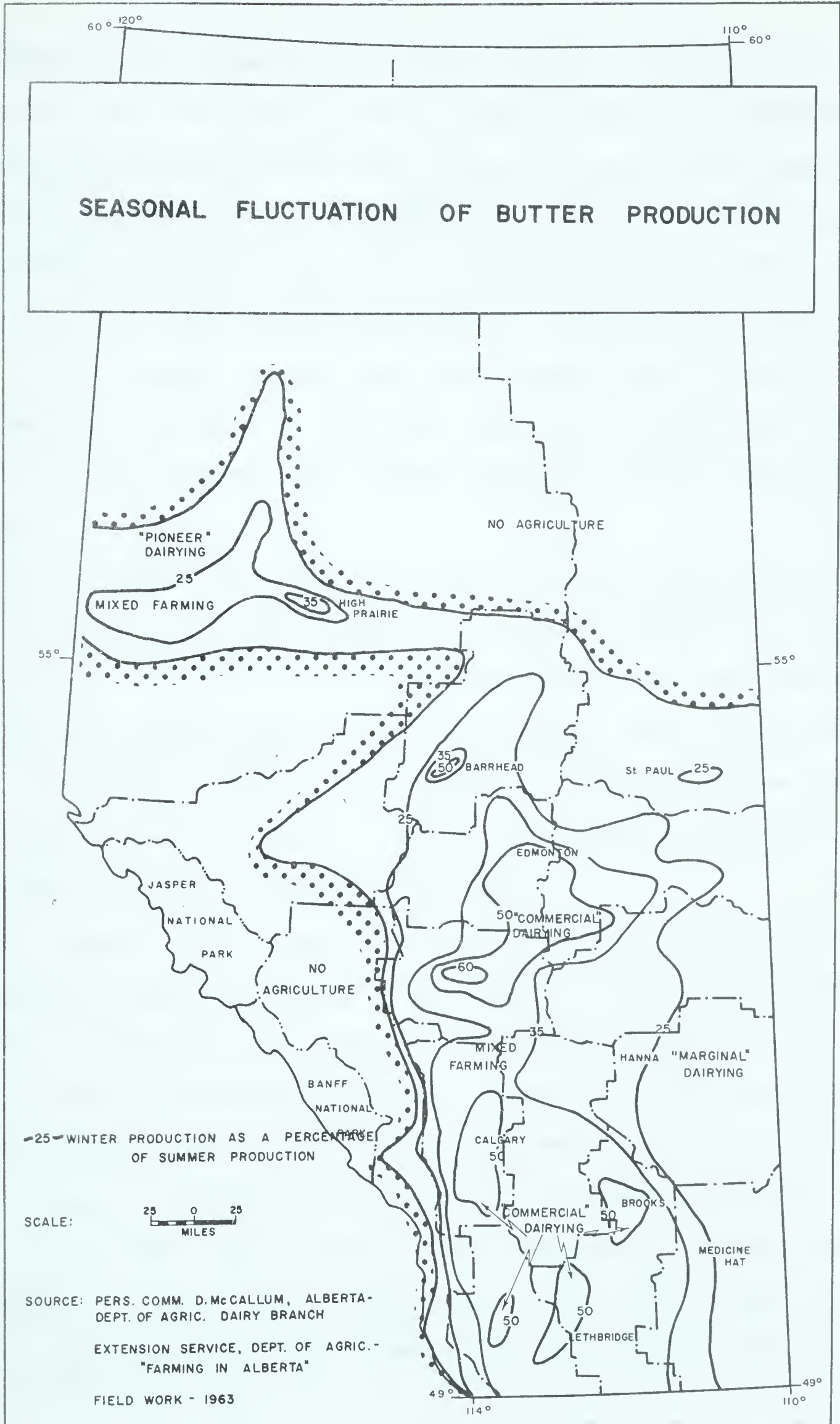
soil zone and most of the milk that is produced is retained on the farm. However, sales of milk and cream have accelerated in the Peace River district since 1946 as urbanization and agricultural specialization continue.

Seasonal Variation of Butter Production in Each Soil Zone

The seasonal variation of butter production provides both a rough guide to the importance of dairying to the local rural economy and some indication of the stage of development of dairy techniques in the various soil zones.

Winter butter production per processing plant, expressed as a percentage of summer butter production, is largest in the black soil zone and in the southern irrigation districts and declines in all directions from this core area for the following reasons (Map 9). The length of the stall feeding period in the north on the grey wooded soils discourages milk production for cream sales because winter feeding costs are too high. This renders the operation uneconomic. Winter butter production of creameries in the south of the province on the brown soils, exclusive of the irrigation districts, is similar in character to that of creameries situated in the northern grey wooded soil zone for roughly the same reason. In the southern irrigation districts, near Lethbridge and Brooks, winter butter production is higher for at least two reasons: large amounts of fodder are available for winter feeding because hay production is necessary in crop rotations to maintain the tilth and fertility of the soil, and because a large propor-

Map 9



tion of the milk production is controlled by a quota policy. This means that milk output must be maintained in all seasons. Surplus milk produced under this system is normally utilized for dairy products, such as butter. The volume of winter butter production does not decline to the same degree in the central black soil zone because dairying is an important source of income in this mixed farming area and because dairy farmers in the immediate vicinity of the major towns and cities are committed to quotas which again often result in surplus milk production.

It is perhaps of interest to note that this phenomenon is also evident to a minor degree in census divisions 12, 13, and 15 in the vicinity of St. Paul, Barrhead, and High Prairie. The first two urban places have milk shippers under quota controls. The third example is difficult to explain because the fluid milk market for this settlement is served by Central Peace Dairy which is located in Rycroft.

In summary, milk output in the black soil zone in central and northern Alberta is increasing because it is an important part of a commercial dairy and mixed farming economy. As a result, butter production fluctuates least with the season. Milk is produced mainly for farm use in many parts of the brown and grey wooded soil zones but the largest proportion of the cream sales take place in the summer when feeding costs are lowest. At best, milk production in the grey wooded soil zone is increasing at a rate comparable with total provincial

increases. In the brown soil zone it has been declining until recently.

CASE STUDIES DEPICTING THE IMPORTANCE OF DAIRYING TO THE
AGRICULTURAL ECONOMIES OF VARIOUS PARTS OF ALBERTA

The foregoing historical, physical and economic factors have had some effect on the distribution, type, and importance of dairying in all parts of Alberta. The origin of the present characteristics of dairying in each census division can be at least partially explained by reference to these factors. If income obtained from the sale of specific classes of agricultural commodities (see Table XVII) is also considered then the relative importance of dairying in any specific area can be examined.

Most evidence seems to indicate that milk production is generally not important in the Peace River district (division 15). Income from dairying in 1960 was only three per cent of the total cash income received from the sale of all agricultural products. The main agricultural activity is the production of cash grains with wheat as the single most important crop. It might be expected that, in an area in which new land is being continually homesteaded, farmers would tend to be more self sufficient in food stuffs and so produce surplus cream for commercial butter production. This appears to be the case only to a minor degree. Dairy plant managers who are located close to places which are in the process of being developed for agriculture report that these areas are the

Table XVII Value of Agricultural Products Sold by 15
Census Divisions Expressed as a Percentage
of Total Income Received From the Sale of
Farm Products - 1960.

Division	Crops	Livestock	Dairy Products	Other Products
1	53	40	2	5
2	53	44	3	-
3	32	64	2	2
4	49	49	2	-
5	57	40	2	1
6	23	66	9	2
7	45	51	4	-
8	23	65	11	1
9	4	89	4	3
10	43	49	7	1
11	23	49	23	5
12	33	58	8	1
13	33	55	10	2
14	25	55	13	7
15	68	26	3	3
Province	38	53	7	2

Source: Based on: Canada. Dominion Bureau of Statistics,
Census of Canada, 1961, Ottawa.

point of origin for a substantial proportion of their raw product. However district agriculturists are dubious that dairying plays an important role in newly settled areas because

they are too far removed from processing plants and therefore shipping costs are too high to make cream production economically feasible. A more plausible reason for the location of dairying in the Peace River block is the amount of unimproved or low quality land. Acton and Spence wrote in 1947 that, "Grain production was associated with good cultivable land; while livestock production was usually associated with poorer land, better suited to pastures".²² Mixed farming predominates in the Peace River district except for the older, flatter, better established agricultural districts which normally specialize in cash grains. Dairying occurs in conjunction with this mixed farming and it appears to be a way in which the poorest land on the farm can be utilized. All district agriculturists report that, except for well bred dairy cows maintained for market milk production, all cows are kept on unimproved pastures. As mentioned previously cows generally are poorly bred and yield low volumes of milk. Their major commercial use is for cream production which is highly seasonal because it appears uneconomic to grow fodder for a long winter feeding period. Dairying in this area might best be described as economically marginal; reliability of income rather than the amount appears to be the major factor in explaining the incidence of dairying.

22. B. K. Acton and C. C. Spence, A Study of Pioneer Farming in the Fringe Areas of the Peace River, Alberta, Publications of the Dept. of Agriculture, Canada, No. 792, Ottawa, 1942, p. 29.

Dairying on the grey wooded soils in census divisions 12, 13, and 14 has many of the characteristics displayed by the enterprise in the Peace River area, with one notable exception; it is more important in terms of the percentage of farmers who maintain dairy cows and the percentage of total cash income achieved from the sale of dairy products (see Table XVII). This increased importance is most likely attributable to the physical characteristics of these divisions. Topography, soils and climate favour a livestock economy and the stage of agricultural development appears conducive to dairying. District agriculturists suggest that much of the area, especially in the northeast, has just emerged from the pioneering stage in which self sufficiency has been emphasized. They point out further, that farms are too small for extensive cash grain farming, in part because a substantial proportion of the land is covered with trees or bush. Therefore dairying remains an important media by which low grade land may be utilized. However many agriculturists foresee an increase in the importance of beef cattle especially in the outer reaches of this soil zone at some distance from major urban markets.

Elgaard suggested that dairying was becoming less important in some parts of division 13 in the late 1940's because farmers were emphasizing the production of forage seeds such as alsike and clover. He suggests further that fodder seed production is not compatible with a livestock enterprise.²³

23. K. Elgaard, A Study of Changes in the Farm Business in the Athabaska Area of Northern Alberta, 1945-1951, Ottawa, 1953.

In 1961 farmers in this census division still ranked second and produced over 11 per cent of the province's total output of forage seed (census division 15 ranked first with 82 per cent of total production) but milk production began to increase again after 1951 most likely in response to increased demand for dairy products in nearby Edmonton.

Although dairying is more important in this part of Alberta than in the Peace River district, in terms of the percentage of income contributed to total farm income by the sale of dairy products, it still might be considered a marginal occupation because cows of questionable breeding fed on low quality pasture produce milk which varies considerably in volume depending upon the season. This generalization is not applicable, of course, to the more specialized dairymen in the vicinity of local urban markets. But the importance of milk production is also expressed in other less obvious ways. For example, the proportion of income derived from the sale of livestock is appreciably higher than that received from either crops or dairy products, but over 51 per cent of the money received from the sale of livestock in 1961 was derived from pigs which were fed, in part, skim milk from cream producers.

Farming is generally of a less intensive nature in the brown soil zone. Climate and fairly flat topography favour wheat and beef production on a large scale and preclude a more intensive crop-livestock combination except in small areas with more favourable agricultural conditions or in

irrigation districts. This area is in a more mature stage of agricultural development than that encountered in northern Alberta and specialization has occurred to a large degree. Rural depopulation occurred here early in the history of settlement in response to drought and government policies²⁴ and farms were amalgamated to form units which could be farmed extensively and economically. Dairying plays a very minor role in the economy of this district and it is often necessary to bring milk from outside areas to satisfy local demand. Many of the cows in the dry farming areas are mixed breeds and they are kept with beef herds. Their major role is to supply home milk needs, as shown in Map 8 but a small amount of surplus cream is sold for the manufacture of butter. Milk production, as expected, is highly seasonal and in fact virtually ceases in winter because this unimportant agricultural activity does not warrant more than a minimum of winter fodder production.

Table XVI indicates that a large proportion of total milk output was sold in 1961 for human consumption in census divisions 1, 2, 3, and 5. The fluid milk producers in these divisions are located to a large degree on irrigated land in proximity to the southern cities. Few, if any, of the 78 commercial dairy farmers in divisions 4 and 7 produce milk on irrigated pastures and their operation appears quite different from the smaller more intensely worked farms in the southern irrigation districts. One dairyman in division 4, who supplied

24. O. S. Longman, Report: Berry Creek Area, Edmonton, 1932.

fluid milk to the town of Hanna, was interviewed by the author in 1962 as to the size and nature of his operation. The interviewee reported that his dairy farm was 2,280 acres in area; just 20 acres smaller than the average farm in division 4 in 1961, and that roughly half of his land was used for the production of feed and cash grains. The remaining area was in summer fallow or used as pasture. His mixed breeds dairy herd consisted of 26 cows which were primarily crosses between Holsteins and Herefords. The farmstead displayed none of the accoutrements normally associated with commercial dairying, such as specialized milking areas, or milking parlours, bulk tanks, and so forth. Although this particular farmer derived more than 50 per cent of his gross income from dairying he seemed bent on developing alternative agricultural pursuits. He was retaining his calves for example, and developing a beef herd. Therefore, although there was a fairly heavy demand for fluid milk in this vicinity which could not be met locally, this dairyman chose to become engaged in beef production rather than increase his milk output. It is perhaps unwise to generalize but this may be one example of why milk production is decreasing in the brown soil zone relative to the remainder of the province (Table XIV).

Farm characteristics in the irrigation districts are more comparable with those of farms farther north in the black soil zone than dry farms in the brown soil area. The average irrigated area per farm was almost 130 acres in 1960 and although

this need not be the exact farm size because many farmers have additional holdings of dry land, it is a good indication of size for a large number of farms. Cash grains are still the most important crop, with 44 per cent of the irrigated area utilized for their production; nevertheless dairying is also important and 36 per cent of the irrigated farmland is devoted to tame hay and improved and unimproved pasture.²⁵ The Eastern irrigation district, near Brooks, is the most important dairying area in a relative sense with roughly 70 per cent of all farmers engaged in this enterprise to some degree, but the irrigation districts in the vicinity of Lethbridge are the most important in terms of the amount of milk produced, although only approximately 30 per cent of the farmers produce milk.²⁶ A fairly large percentage of milk output is sold for human consumption (Table XVI.) but cream and hog production are other important aspects of dairy farming on irrigated land.

In summary, there are two distinct types of dairying in the brown soil zone; a marginal operation on dry land in which milk is produced largely for home use, likely because service centres, where milk might be purchased, are widely scattered and, a more commercial type of dairying on irrigated land for the most part which involves sales of large volumes of milk

25. Canada. Dominion Bureau of Statistics, Census of Canada, 1961, Ottawa.

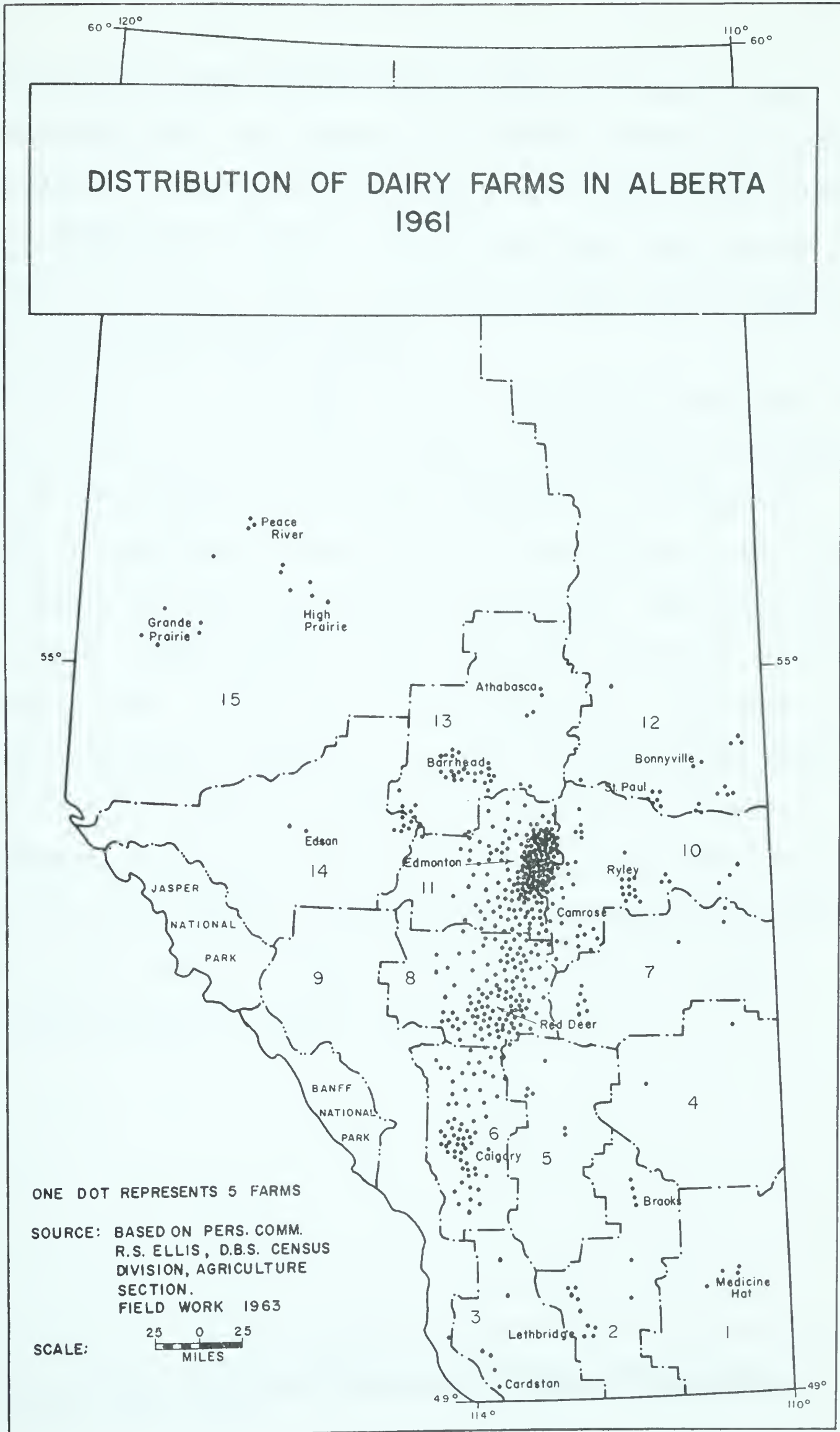
26. Pers. comm., Questionnaire to all District Agriculturists in Alberta, 1963.

and cream to major urban markets or local manufacturing plants.

Many of the indices and the characteristics of farms which were examined earlier indicate that dairying in the black soil zone is more commercial than in most other parts of the province. As stated previously, over 63 per cent of all farmers in this zone reported milk production in 1961 and in every census division over 70 per cent of those reporting milk production also reported sales of milk or cream. The manufacture of butter, when compared with the remainder of Alberta, fluctuates least with the season. Winter output is at least 50 per cent of summer production for most of the district. Only a small percentage of whole milk production is retained on the farm for household use because many farmers buy their dairy requirements rather than produce them on the farm. This zone also has the greatest number of farmers who achieve at least 51 per cent of their gross income from the sale of dairy products. The distribution of these commercial dairy farmers (Map 10) reflects urban milksheds for the most part but in census division 8 the distribution is also related to the production of industrial milk.

The major source of income for the entire black soil zone is from the sale of livestock. Beef cattle contribute the largest percentage to this source of income but pig sales rank next in importance. Pigs are most important in those divisions in which revenue from the sale of dairy products is highest. The correlation between the incidence of dairying and hog pro-

Map 10



duction has been cited earlier and a study of farms in the Westaskiwin-Red Deer area appears to further substantiate this relationship.²⁷ Roughly 80 per cent of all farms sampled reported a combination of grain, beef, hog, dairy and poultry production from which over 43 per cent of gross farm income was derived from hog and dairy sales.

The reasons for the character of dairying in this area are varied: it was one of the first areas to be settled in Alberta because of the nature of the soil, topography, and natural vegetation and perhaps in the absence of mechanical power farms were of necessity small and intensively worked. Dairying fitted well with a mixed farm economy especially as urban markets increased in size. Even with the advances in transportation and dairy technology, which give farmers in potentially better dairying areas in the grey wooded soil zone easier access to urban markets, dairying, nevertheless, will remain important in this soil zone because large capital investments have been expended in the course of developing the industry on structures and equipment not easily moved.

27. H. E. Abell, Proposed Changes in Farming Enterprises, Ottawa, 1953, p. 9.

CHAPTER V

MILKSHEDS

Dairying appears to be a secondary and not necessarily preferred source of income for many farmers engaged in mixed farming in Alberta. If farms are marginal for cash crops because of climatic limitations, infertile soil or inadequate size then farmers, in many instances, include dairying as whole or part of their enterprise. Dairying, however, is a deliberate choice in the major milksheds because it has proven to be a more reliable source of income and is at least as profitable as other types of farming in terms of total net income, although perhaps not as profitable when labour inputs are considered. This interest in dairying is reflected in the measures of specialization cited earlier and in the fact that the contractual agreement between the dairy producer and dairy processor has, in itself, become a saleable commodity. The agreement, or quota allotment, appears in fact to have changed in meaning from an obligation to supply a fixed amount of milk to a right to ship this commodity. The most recent entrant into the processing sector of the dairy industry in the Edmonton milkshed has capitalized upon this increased interest in dairying by selling quota contracts (during the course of establishing a milk supply) although it is unlikely that they represent any cost to the vendor.

Intensive milk production under both health regulations

and quota restrictions takes place in areas adjacent to most urban centres in the province. The milksheds surrounding the two major cities of Alberta are, however, perhaps the best areas of study because a wide array of factors are portrayed which, at least partially, increase our understanding of the characteristics of most milksheds and their associated patterns of development.

The purpose of this chapter is to illustrate the limits of the Edmonton and Calgary milksheds and to examine the distribution of milk production within each. An attempt is made to relate production to physiographic patterns and historic events. These two variables are stressed because information pertaining to them is more readily available than that with respect to production costs. Had this latter type of information been available then the influence of the economic factors which affect the production of milk might have been studied more closely. Lastly, the main farm characteristics and the general shape of the milksheds are compared and suggestions are made as to where future growth may take place.

GENERAL CHARACTER OF THE EDMONTON MILKSHED

The first zone of agriculture surrounding urban centres in the western, or occidental world, is traditionally occupied by an intensive form of agriculture which produces a bulky and perishable product. Dairy products are of this type and dairying is found throughout this zone. It is, however, rare for dairy farms to be distributed evenly throughout, rather

they tend to occur in local concentrations. This generalization holds true for the Edmonton milkshed, because fluid milk producers are located in all directions from the edge of the city but the bulk of the city's milk requirements are met by a concentration of milk shippers in the eastern and southeastern portions of the milkshed (Maps 11 and 12).

The use of the term milkshed appears restricted to the twentieth century although the practise of keeping dairy cows adjacent to urban centres dates back to 4000 B.C., in Mesopotamia.¹ The similarity of the term milkshed to watershed is indicative of its character. It is an area in which all milk produced for human consumption gravitates to a centrally located market. This differs from the general movement of other agricultural commodities in this province because producers in one milkshed are prohibited by law from selling milk elsewhere. Markets for processed dairy products are also restricted, although this latter ruling is presently being challenged in Alberta.² The area of retail milk sales does not necessarily coincide with the milkshed, or supply area, however, and regulations affecting milk distribution in the former area have little bearing for the most part, on the locus of the latter.

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1. G. Fielding, Dairying in the Los Angeles Milkshed: Factors Affecting Character and Location, Unpublished Ph.D. thesis, University of California, Los Angeles, 1961, p. 4.
 2. In 1963 Purity Dairy sold bottled, pasturized milk in Red Deer although it has been produced and processed in Lethbridge.

However, a study of the Calgary milkshed revealed that formerly, economics, and more recently, the maintenance of good will occasionally resulted in a dairy firm extending the milkshed to the farthest limit of its retail sales.

In addition to the milkshed, which is delineated fairly concisely, there is a broad, shifting, rather amorphous zone surrounding Edmonton from which substantial amounts of cream are obtained. Farmers in this zone are not affected by municipal health regulations or legislation enacted by the provincial government and many of the variables associated with commercial dairying have a negligible effect on cream production. This area, or "creamshed", constitutes a study in itself and will not be fully dealt with in this discussion.

The Edmonton fluid milk market was served by five dairies in 1964 which obtained approximately 302 thousand pounds of milk daily for this purpose from 441 milk producers. These shippers were rarely more than forty miles from the present day boundaries of the city. Most dairy farmers shipped more milk than required by their quota agreements in order that they might qualify for increases in quota, allotted from time to time by the Milk Control Section of the Board of Public Utilities. It was from this surplus milk that a major portion of the city's industrial milk requirements were met. Each dairy manufactured milk products in addition to the main enterprise of selling fluid milk, but there were two establishments whose sole function was to process cheese, in one case

and ice cream in the other. Both of these plants obtained their raw materials from the other major dairies and had little, if any, effect on the character of the milkshed. Therefore their activities will be largely ignored for the purpose of this study.

History and Growth of the Edmonton Milkshed to 1964

The early history of dairying in the Edmonton area prior to the institution of control of the fluid milk industry in 1933 by the Board of Public Utilities has been discussed previously (Chapter II).

Shortly after the creation of the Milk Control Section of the Board of Public Utilities, the dairy industry in Edmonton underwent some noticeable changes. There was, for example, a rapid reduction in the number of producer-distributors and the radius of the Edmonton milkshed contracted to a fifteen mile limit. The decline of producer-distributors was likely hastened by price reductions for retail milk instituted by the provincial government.³ Smaller profit margins apparently discouraged the fully integrated producer-distributor from expanding his operation. Dairy processors in Edmonton were not affected to the same degree because of their larger volume of production. It should not be inferred that price reductions were the sole reason for the demise of producer-distributors. Their operations were too small to warrant

3. Pers. comm., J. B. Moore, Administrator of Milk Control Section, Board of Public Utilities, Edmonton.

purchases of equipment to pasturize milk and a growing awareness of the potential health hazard posed by unpasturized milk certainly diminished the attractiveness of their product to the public.

It is difficult to ascertain the mechanism by which the Edmonton milkshed was controlled in areal extent because the directorates of various municipal and provincial departments are reluctant to discuss this stage in the history of the development of the Edmonton milkshed. They do, however, suggest why such control was necessary. In order to qualify as a milk shipper in milksheds under the jurisdiction of the Board of Public Utilities a farmer needed two licenses, one issued by the provincial government establishing his quota and the other from the Board of Health in the municipality in which he expected to sell his milk. There is some suggestion that the latter license was not issued to farmers beyond the fifteen mile limit and therefore they were denied access to the Edmonton market. Although farmers, who wished to sell milk at this time but resided outside of the fifteen mile boundary, may have argued differently, there was no manifest ulterior motive for this procedure; in fact the opposite appears to be more nearly the truth. Reasons suggested for this limit seemingly reflect concern on the part of city health officials for an assured supply of milk free from contamination.⁴ Dairy farm technology did not involve refrigeration in the decade of the thirties and the danger of milk spoilage was increased

4. Pers. comm., J. Merideth, Milk Inspector, Board of Health, Edmonton.

by delivery problems associated with poor roads. Edmonton's milk requirements could be supplied adequately from this reduced area and therefore transportation problems were minimized. This areal limitation had the welcome side effect of protecting fluid milk shippers in a difficult economic period from excessively severe competition from those farmers residing outside of the milkshed. (It will be recalled that the Board of Public Utilities established a Milk Control Section to stabilize the dairy industry.) It is highly likely that this concern for uncontaminated milk was legitimate but there is also the hint that fluid milk control in the major milksheds may have been achieved under the guise of health regulations.

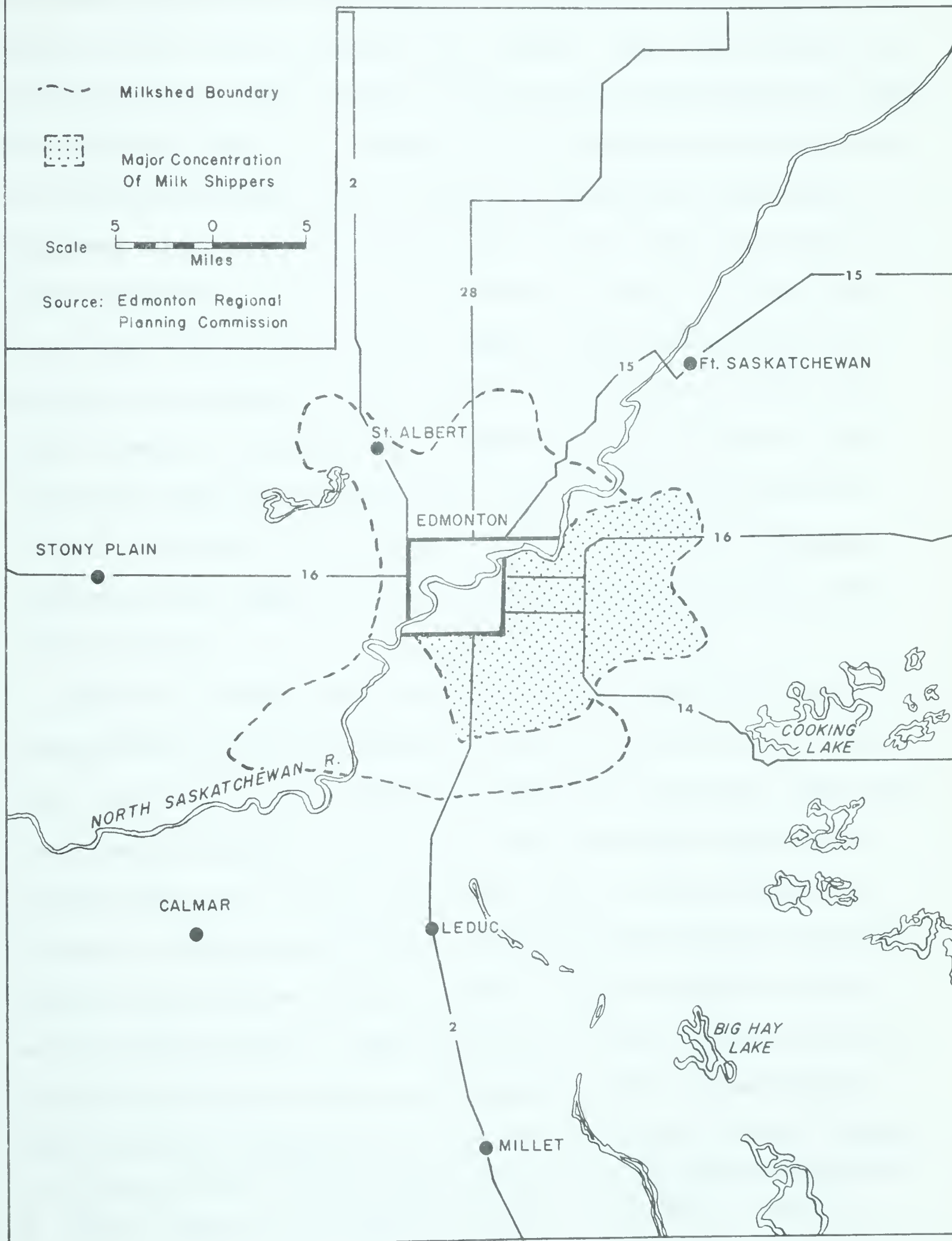
In 1937 more than fifty per cent of the dairy farms in the Edmonton milkshed were located immediately to the southeast of the city (Map 11). Minor concentrations also existed east and north of Edmonton along Highway 16 and between Highways 15 and 28. The reasons for this distribution seem linked, at least partially with transportation facilities and with topography.

Truck service for hauling milk had developed prior to 1937 with the growth of gravelled highways and this resulted in lessened use of the railway for the delivery of farm products within a relatively short distance of urban markets.⁵ Railway transportation had been important nevertheless in the initial establishment of dairying prior to the widespread

5. G. H. Craig et.al., "The Production of Fluid Milk in the Edmonton and Calgary Milksheds", Scientific Agriculture, Vol. 17, No. 7, 1937, p. 403.

Map 11

THE EDMONTON MILKSHED - 1937



use of trucks. Southeast of the city it continued to be a suitable alternative to Highway 14 which, although gravelled before 1937, was not paved until 1952.⁶ The other minor concentrations of dairy farms were situated in proximity to more serviceable roads; for example, near Highways 15 and 16, both of which were major traffic arteries during the thirties, (Highway 15 having been paved north of the city as early as 1930 and Highway 16 as early as 1938). Both of these areas were also serviced by railway lines. But dairying did not develop in response to this factor alone because these and other areas in the environs of Edmonton had excellent rail and paved road connections with the city yet dairying has failed to develop to any great extent. Therefore adequate transportation appears to have been more of a limiting than causal factor.

Not all farmers who settled in this region were aware of the methods and possibilities of dairy farming because they were not known in the county or district from which they came. Conversely, farmers coming with this knowledge might easily try dairying even if the operation was not particularly favoured by other factors and a group of such farmers would be hard to account for in an economic or environmental framework of explanation. Alternatively a single farmer making a success of dairying because of unusual skill in management might lead his neighbours to imitate him with similar conse-

6. Pers. comm., K. T. Dawson, Dept. of Highways, Alberta.

quences for the student looking for explanations. This is obviously an extremely difficult topic to study, especially since census data have not been collected for political units small enough to be useful in the examination of a single milkshed. It can only be assumed that there were farmers with this information (a fact which may reflect their ethnic origin) and that they may have chosen land well suited to this type of agriculture.

Most dairy farms in 1937 were situated on land which is rated in the soil survey of the Edmonton area as "good to very good arable".⁷ Cash grains, coarse grains and fodder can be grown with equal ease in terms of the inherent characteristics of the soil, but the topography is further described as gently rolling to rolling. This latter factor may have favoured dairying rather than cash grain farming because of the difficulty of tilling rolling land, especially when horses were the main source of power. The roughest areas can be utilized as permanent pastures in a dairy economy whereas rough land would be largely unproductive if cash grain farming were the main enterprise.

B. J. McBain, Supervisor of Farm Cost Studies for the Alberta Department of Agriculture, suggests that the original average farm size was smaller in some sections of the Edmonton area than immediately to the south. Many of the first set-

7. W. E. Bowser et.al., Soil Survey of Edmonton Sheet (83-H), Alberta Soil Survey Reports, No. 21, Edmonton, 1962.

tlers, of Slavic origin, arrived in this district with very little capital and were unable to purchase or clear large tracts of land.⁸ These people were largely unfamiliar with dairying and it is unlikely that they engaged in it. Their small farms, however, especially in the rolling area to the southeast of the city, were best suited to dairying because they were too small for many types of agriculture, and their topography often favoured fodder production. The most common use of the land initially was a crop-livestock combination, but later, this proved unprofitable because neither enterprise could be made large enough to maintain the higher standard of living desired by subsequent owners. Dairying appeared to fit their needs admirably. If this pattern of settlement did occur then the next step involved the displacement of smaller dairy farmers by their more successful neighbours because the average dairy farm in the Edmonton milkshed was larger in 1961 than the average farm in the same general area.⁹ It is likely that dairy farm size was modified by this method, particularly during the thirties, a period characterized by economic setbacks and a rapid turnover of dairy farmers in the Edmonton milkshed. The instability of dairy farming is further demonstrated by the fact that the total number of shippers increased by only 52

8. Pers. comm., B. J. McBain, Supervisor, Farm Cost Studies, Farm Economics Branch, Dept. of Agriculture, Alberta.

9. The records of the dairy cost study, conducted by B. J. McBain, indicate that the average dairy farm in 1961 was 439 acres in size. The average farm size in division 11 was 310 acres in 1961.

from 1937 to 1950 although there were 214 new entries into the milkshed in the same period.¹⁰

In spite of the incentives (cited in Chapter II) offered by the War Time Prices and Trade Board, milk was in short supply in Edmonton during the second world war. The influx of military personnel created a demand which was not satisfied by farmers within the fifteen mile limit. Officials of the City Health Department granted licenses authorizing milk shipments to almost any farmer who could meet their requirements and who could obtain a quota license from the provincial Board of Public Utilities. Although one might expect that these conditions would result in more milk shipments from farmers located on the gently rolling to rolling farm land to the southeast of the city and a decline in milk output in areas where cash grains could be produced for European markets, such was not entirely the case. As previously stated, the policy of the Milk Control Section of the Board of Public Utilities favours those who have demonstrated an ability to fulfil the terms of their quota contracts. Cream shippers who had been hitherto licensed in Edmonton to sell cream for human consumption were given the opportunity to enter the fluid milk market. Most of these shippers were located south of the city in the vicinity of Leduc and Millet. Climate, soils and topography in much of this area are suited equally to cash grain or fodder pro-

10. Edmonton District Planning Commission. Map of the Milkshed of the Edmonton District, Edmonton, 1952.

duction. But farmers have rarely experienced difficulty in selling cream or milk because this is the collection area for many local plants. Demand was especially heavy from Camrose and Wetaskiwin and prior to being licensed as Edmonton cream shippers these dairymen shipped cream for butter production to both centres. It was, perhaps, these many opportunities for the disposal of milk that encouraged the growth of dairying here. However, when given the opportunity to ship milk even though they were fairly distant from the Edmonton market, they did so partly because transportation costs did not appear prohibitive. Highway 2 had been a major route for some time and its condition facilitated rapid communication with Edmonton, partially negating the effect of distance.

The foregoing is not meant to be an exhaustive analysis of all of the factors affecting the expansion or location of Edmonton's milkshed but it does, perhaps, increase our comprehension of the origin of the present characteristics and patterns associated with dairying.

The Edmonton Milkshed - 1964

The 1964 Edmonton milkshed (Map 12) represents a more attenuated pattern than that of 1937. These finger-like extensions indicate that farmers who are located near major highways are favoured with reference to milk collection routes. It is unlikely that haulage costs are responsible to any significant degree because they are assessed by zones which are arranged in concentric rings around the city. Dairymen's

THE PHYSIOGRAPHIC UNITS 1964

Milk Production Per Township

0.0 - 1.9 Percent

X - Early North Saskatchewan River Area

2.0 - 4.9 Percent

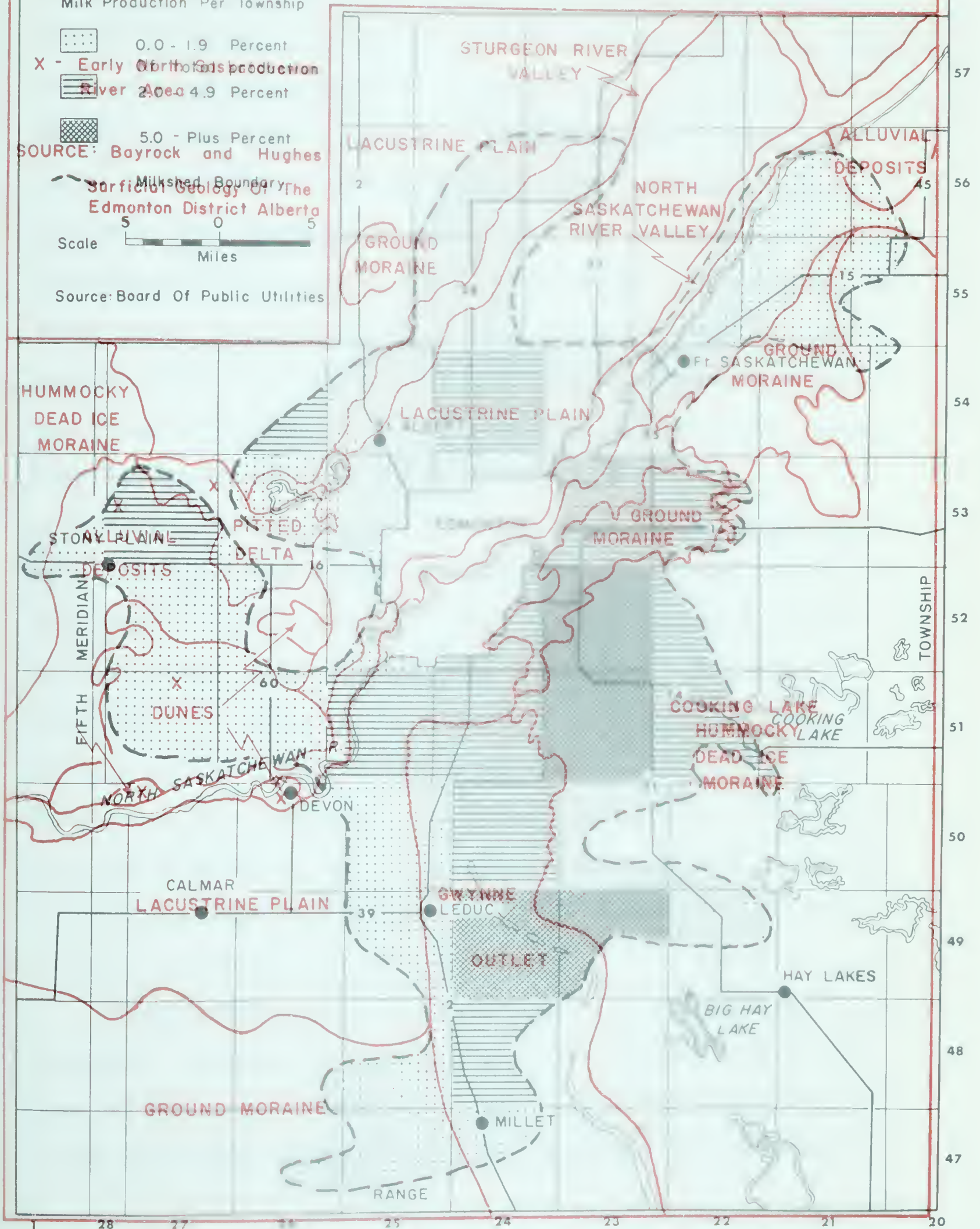
5.0 - Plus Percent

SOURCE: Bayrock and Hughes

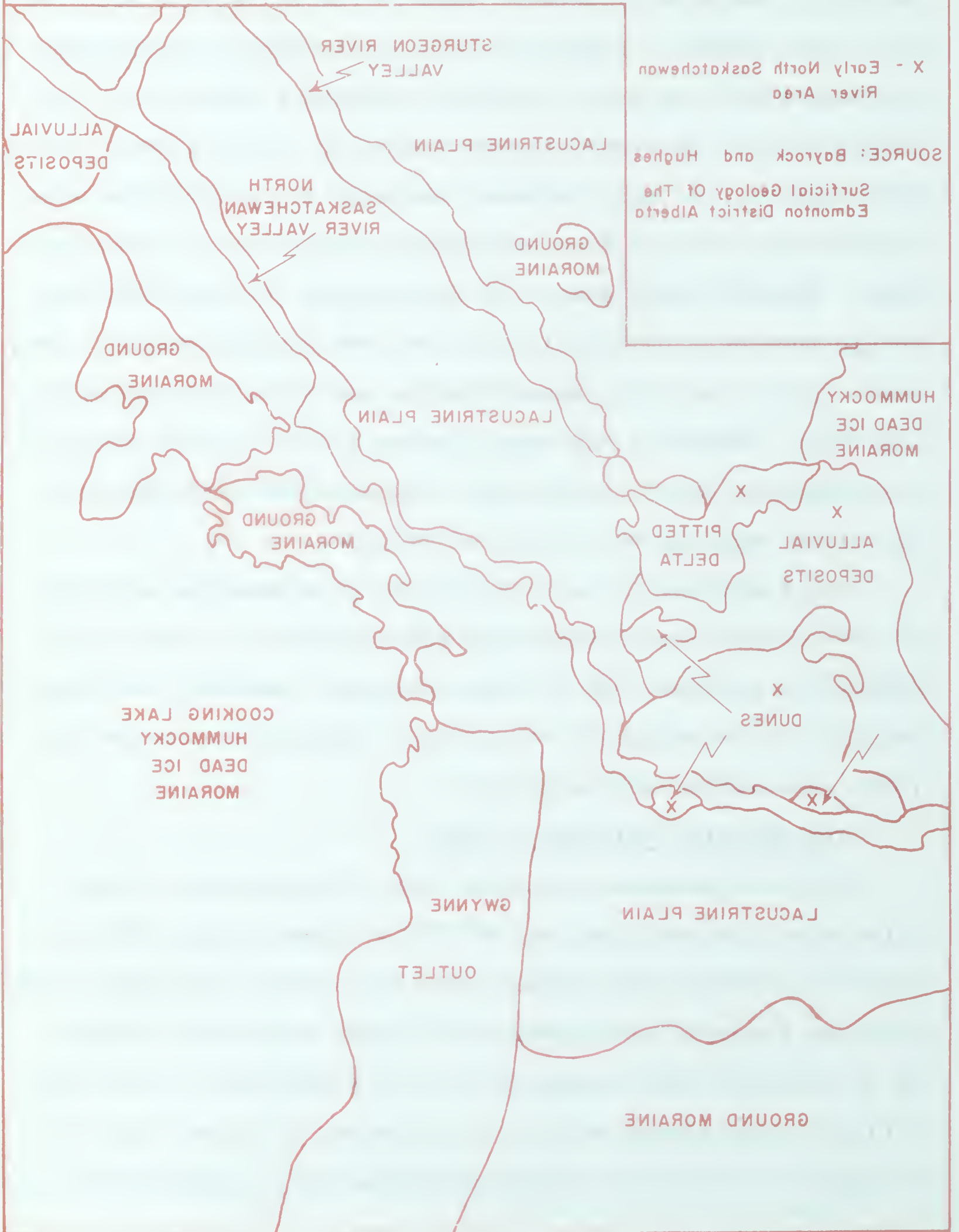
Surface Boundary of The Edmonton District Alberta

Scale 5 0 5 Miles

Source: Board Of Public Utilities

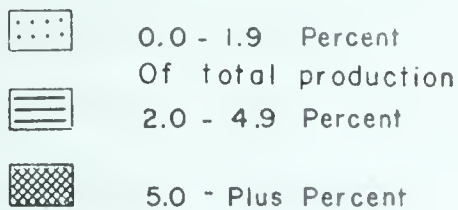


PHYSIOGRAPHIC UNITS



THE EDMONTON MILKSHED - 1964

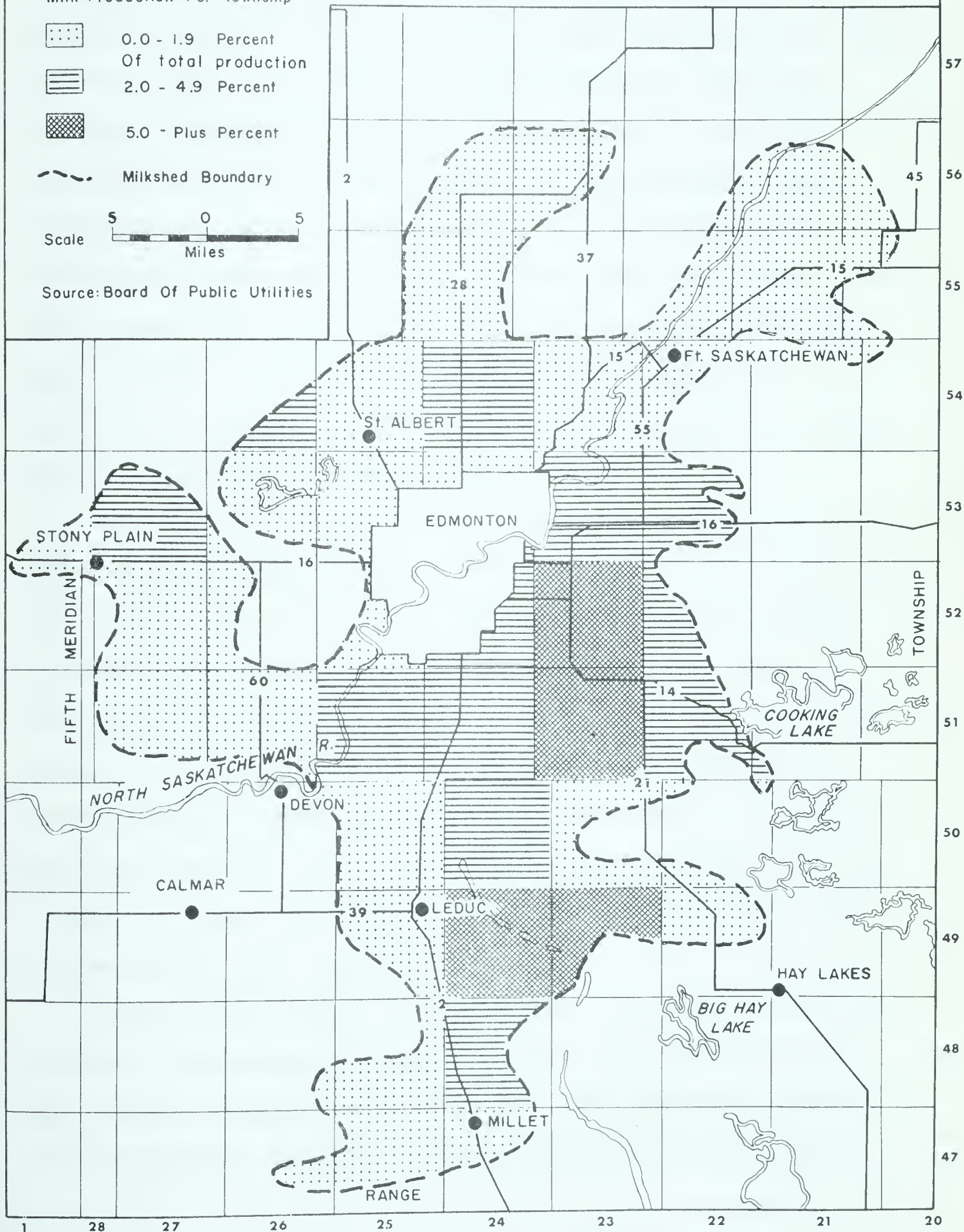
Milk Production Per Township



--- Milkshed Boundary



Source: Board Of Public Utilities



costs, no matter what the condition of the road, do not vary within a specific ring even though some individuals may be a greater distance from the processor than others who are situated on a main thoroughfare leading directly to Edmonton. However, collection is easier along the major routes and these projections on the periphery of the milkshed likely represent the vanguard of expansion. It is conceivable that trucking concerns are willing to extend their operations into these areas that are marginal both in an economic and geographic sense as long as they are serviced with major thoroughfares. The less accessible margins are then only gradually incorporated into the milkshed.

Although the area of the milkshed is still expanding the major change is consolidation within the confines of its present limits. For example, increasing herd size was alluded to in Chapter III and, perhaps more important, the number of licensed milk producers is declining in spite of annual increases in total milk sales in Edmonton (see Table XVIII). Production per farmer generally has increased and is especially noticeable for the last decade excepting 1964, the year in which another processor entered the Edmonton market and contracted new milk shippers.

Speculation, as to the focal point of consolidation, is premature because the evidence for this process indicates that it has occurred only recently. Consolidation takes at least two forms: shippers close to Edmonton in the oldest

Table XVIII Annual Milk Production and the Number of Licensed Milk Shippers in the Edmonton Controlled Area - Selected Years.

	Year					
	1953	1956	1959	1962	1963	1964
Number of Licensed Milk Producers	470	458	459	442	435	468
Total Milk Purchased from Shippers in '000,000's of Pounds	71	101	134	145	148	156
Average Annual Milk Production per Shipper in '000's of Pounds	152	219	292	330	340	334

Source: Milk Control Section, Board of Public Utilities.

part of the milkshed are increasing substantially the size of their operations, and smaller shippers are concentrating in specific areas within the shed. This latter phenomena appears to relate partially to physical conditions encountered in the vicinity of Edmonton and is worth further examination.

The Relationship of Dairying to Topography and Soils

The city of Edmonton is situated on a lacustrine plain deposited in proglacial Lake Edmonton (overlay on Map 12).¹¹ The physical features to the west of the city are composed mainly of braided alluvial material deposited by the early North Saskatchewan River as it drained into proglacial Lake

11. L. A. Bayrock, and G. M. Hughes, Surficial Geology of the Edmonton District, Alberta, Edmonton, 1962.

Edmonton. This district is covered by shallow braided channels and in one section by dunes created from former delta deposits by westerly winds in the immediate post glacial period. The lacustrine plain is terminated by ground moraine at its eastern boundary and a hummocky dead ice moraine, the Cooking Lake moraine, is in turn located east of this feature. Proglacial Lake Edmonton drained to the south through the Gwynne Outlet which is marked by more rolling topography than is encountered on the lacustrine plain and enough stony material in various parts to offer some obstruction to cultivation. The soil characteristics vary in each physiographic unit and an examination of aerial photographs reveal that specific land use patterns also appear to be related to topography.

The coincidence of dairying and the aforementioned features is illustrated by the overlay on Map 12 for which milk production in each township has been computed as a percentage of the total milk output of the entire milkshed. The figures have been grouped by physiographic unit in Table XIX to show the relationship more clearly. The physical features vary in extent, of course, and the area of that part of each feature which falls within the confines of the milkshed has been estimated in order to indicate its relative importance.

Fluid milk production is concentrated to a large degree on the grey wooded soils of the ground moraine and the Cooking Lake moraine to the east of the city. Over a quarter of Edmonton's milk is supplied by dairymen on the lacustrine

Table XIX Milk Production by Physiographic Unit - 1964

Unit	Approximate Area in Square Miles	Milk Production per Unit as a Percentage of Total Milk Output	Milk Production per Square Mile in 000's of Pounds
Ground Moraine	54	10	290
Cooking Lake Moraine	144	33	364
Gwynne Outlet	126	13	166
Early North Saskatchewan River Deposits	180	18	153
Lacustrine Plain	504	26	80

Source: Based on statistics from the Milk Control Section of the Board of Public Utilities.

plain but if milk production per unit of area is considered then this is one of the least important parts of the milkshed. This point is particularly striking since this physiographic unit lies closest to the city. The early North Saskatchewan River deposits west of the city are not intensively used for fluid milk production either, although farmers in some sections supply large volumes of cream for butter production. Dairymen in the Gwynne Outlet area do not contribute much to Edmonton's total milk supply but in terms of output per unit area this physiographic unit ranks third.

Examples of the effect of historic events and political influence, previously described, indicate that the reasons for this pattern of dairying are diverse. Physiography does however appear to be a factor in shaping a farmer's decision as

to how his land should be utilized. It is possible, therefore that this broad correlation between dairying and topography reflects the adaptations made by the farmer in response to physical variables.

Some of the reasons for the prevalence of dairying in the moraine to the east and southeast of the city have been presented and the physical attributes of the district likely continue to render it more suitable for dairying than for other types of agriculture. The podzolic soils of the Cooking Lake moraine are generally more suitable for growing fodder than for sustained production of cash grains. Surface patterns are quite irregular and many depressions are occupied by sloughs. The rough terrain and infertile soils are best adapted to forage crops and hence to a livestock economy. Perhaps one of the most surprising features of dairying in the Edmonton milkshed is that farmers skirt this part of the moraine when they are displaced by urban expansion and relocate farther south in the vicinity of Hay Lakes on a less rugged part of the moraine that has already been improved for agriculture.¹²

High yields, of either cash grain or forage crops are obtained from the extremely fertile chernozem soils of the lacustrine plain. Farmers in this zone have a wide variety of potential enterprises from which to choose and their selection is likely to be influenced by other factors. For example, if farm size is adequate for cash grain production then

12. Pers. comm., B. J. McBain, op.cit.

dairying would likely be ignored because much more labour is involved for approximately the same cash return. Further studies may indicate that the ethnic origin of the farmer may also influence his activities. Many settlers of Ukrainian origin have located near Edmonton and a cursory examination suggests that these people favour grain farming. The Calmar district is noted for its concentrations of Ukrainian folk and this area is not part of the Edmonton milkshed (Map 12) whereas farther east, on the lacustrine plain near Leduc, farmers of diverse ethnic origin do produce fluid milk for Edmonton.

The dunes and early North Saskatchewan alluvial deposits vary in their suitability for farming. Soil ratings range from very good for agriculture to recommendations that many areas remain under native vegetative cover.¹³ Wind erosion is a major problem that must be considered in any suggestion for the utilization of the fine textured alluvial material. Possible uses outlined in the Edmonton district soil report emphasize coarse grains and forage crops. Extensive tracts of organic soils in association with sand dunes have little use in the foreseeable future other than for rough pasture, but equally large proportions of this physiographic unit appear adaptable for dairy farming especially in the vicinity of Highway 16. In answer to the question of why this type of agricultural enterprise is not well developed in this area it is suggested that farmers wishing to dairy here would be

13. W. E. Bowser; et.al., op.cit.

faced with the same difficulties encountered on the Cooking Lake moraine: much of the land is in the early stage of development and needs to be improved.

Lastly, soil conditions and topography are not favourable for cash grains in many parts of the Gwynne Outlet and it is recommended, in the Edmonton district soil report, that these areas be given special care. This report also suggests that the poorer sections remain as permanent pasture or at best be used for coarse grains. Examination of aerial photographs indicates that land use in much of the area conforms with these recommendations. Dairying then is suited to much of this zone.

GENERAL CHARACTER OF THE CALGARY MILKSHED - 1964

Many of the factors that have influenced dairying in the Edmonton milkshed have similarly affected the dairy farmers who service Calgary. The historic development of the Calgary milkshed is therefore ignored and only the most recent patterns are discussed. Table XX is included to illustrate the latest trends in total milk production, number of shippers and production per shipper. The trends are much the same as those displayed in Table XVIII for the Edmonton Controlled Area. The increment in milk sales per shipper is more noticeable however, because the introduction of bulk milk tanks in 1959-1960 hastened a reorganization of the industry which may have been already underway.

In 1964, 261 fluid milk producers delivered a total of approximately 216,000 pounds of milk daily to four processing

Table XX Annual Milk Production and the Number of
Licensed Milk Shippers in the Calgary Con-
trolled Area - Selected Years

	Year					
	1953	1956	1959	1962	1963	1964
Number of Licensed Milk Producers	268	320	347	277	264	261
Total Milk Purchased from Shippers in '000,000's of Pounds	57	74	95	107	109	113
Average Annual Milk Production per Ship- per in 000's of Pounds	211	230	274	382	423	433

Source: Milk Control Section, Board of Public Utilities.

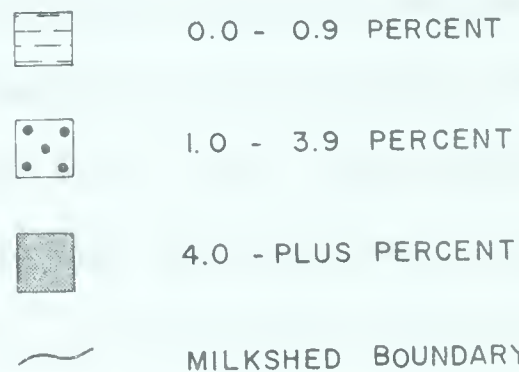
plants. There were two other factories, in addition to these four, which produced butter and in one case processed cheese. Both were primarily meat packing establishments and the manufacture of butter and cheese appeared to be a residual function emanating from an operation which was more diversified in the past.

Perhaps one of the most striking differences between the Edmonton and Calgary milksheds is that milk producers in the latter are distributed over a much broader area (Map 13). However, as in the Edmonton milkshed, there are local concentrations of shippers who supply a large part of the city's milk needs. One such concentration is located immediately west and north of Calgary in the thin black soil zone. This

Map 13

THE CALGARY MILKSHED - 1964

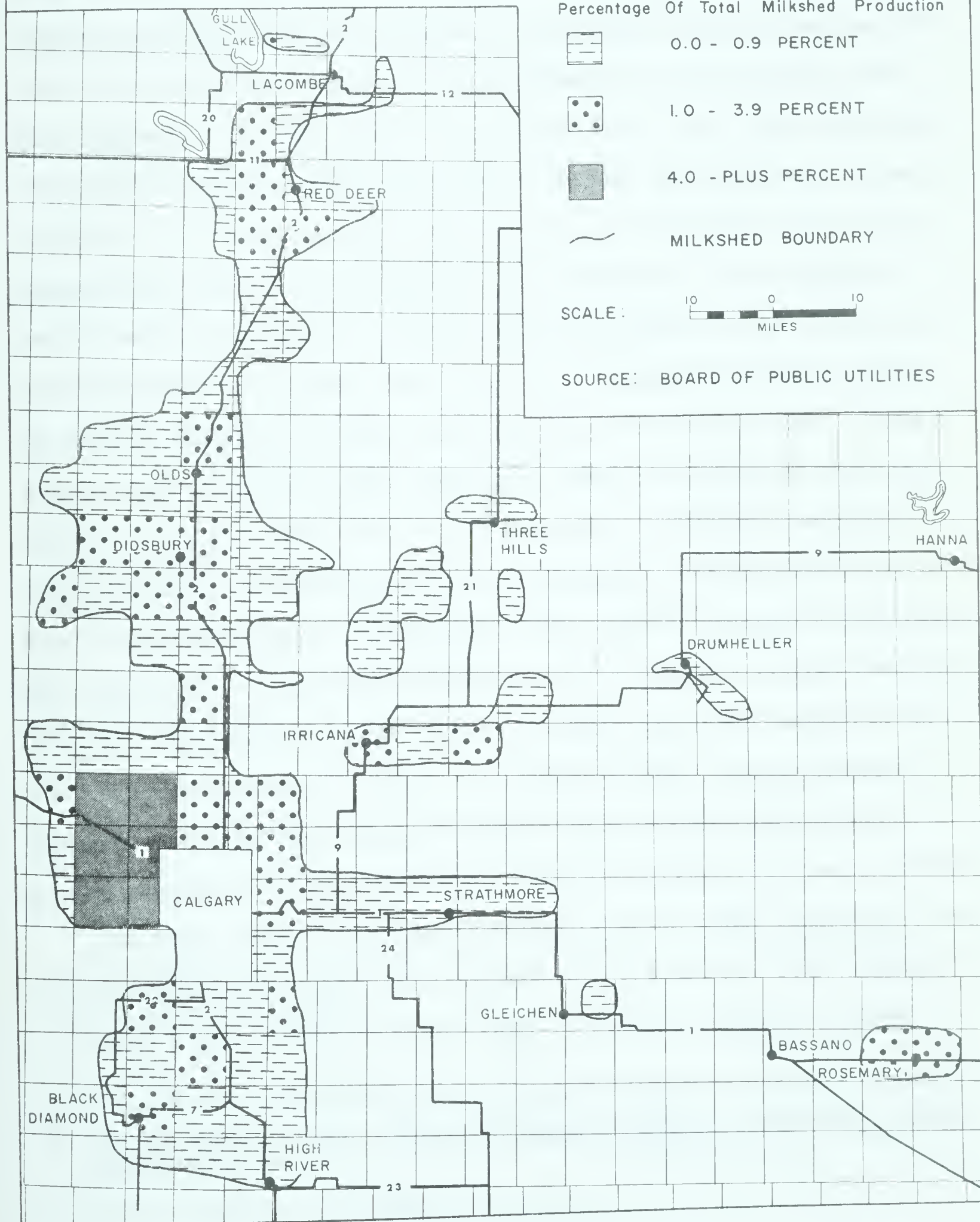
Milk Production Per Township As A Percentage Of Total Milkshed Production



SCALE:



SOURCE: BOARD OF PUBLIC UTILITIES



district is marked by broken topography and many sloughs.¹⁴ These conditions perhaps render it marginal for extensive cash grain production but dairying has flourished partly because of them and partly in response to the demands of the nearby Calgary market. (It may also be recalled that this area was the site of the first commercial dairy venture in Alberta, a cheese factory.) Climatic conditions are more favourable for forage production than for cash grain crops because it is slightly wetter here, possibly a little cooler because of the increased elevation and the frost free season is slightly shorter (Maps 7A and C, Chapter IV) than farther east on the prairie. Dairying is also important near Didsbury and this area has supplied milk to Calgary since the early thirties. McBain¹⁵ suggests that climatic conditions have been largely responsible for the fact that dairying is widespread here. Hail frequently destroyed cash grain crops near Didsbury so the farmers petitioned the city for licenses to ship milk. In this way they hoped to salvage damaged grain by using it as green feed. They also realised that hay was a more suitable crop under these conditions because it often recovers from the effects of hail storms.

In some cases dairying flourishes quite some distance from the city near the site of a former dairy factory. For example, a cheese factory and creamery were located at Black Diamond

14. F. A. Wyatt, et.al., Soil Survey of Rosebud and Banff Sheets, Edmonton, 1943.

15. Pers. comm., B. J. McBain, op.cit.

and Drumheller respectively and during the course of the expansion of the Calgary milkshed dairymen who shipped to these plants were absorbed by Calgary processors. The advantage of accepting a milk shipper sometimes 100 miles distant is not immediately obvious unless the attitudes of the inhabitants of these local towns are examined. The residents view the local creamery or milk processing plant as a traffic generator. Farmers delivering their produce here often use the other commercial services provided by the local merchants. If milk processors in Calgary wish to buy out the local dairy and add the town to their market area they are expected to accept milk from former shippers in order to maintain the good will of the business community. In this way the newly purchased plant merely becomes a depot for the receipt of raw (unprocessed) milk and a distributing centre for dairy products manufactured in Calgary. Initially this may have made some economic sense because trucks hauling finished milk products to these towns did not return empty. Since the introduction of bulk tanks, which require specialized vehicles to haul the milk, this advantage has been lost.

A COMPARISON OF SOME OF THE CHARACTERISTICS OF THE EDMONTON AND CALGARY MILKSHEDS

Some aspects of the last discussion may suggest that dairying near Calgary is not as specialized or intensive as that practised around Edmonton. The milkshed of the former is much larger than the latter and yet total milk output is de-

cidedly lower; the material in Chapter III, pertaining to degree of pure breeding, suggests that Calgary cows are not as well bred as those closer to Edmonton; and lastly, milk yields per cow were indicated as being noticeably lower for Calgary. A perusal of dairy farm characteristics and yield per farm suggest that conclusions based solely on these indicators may not be entirely correct.

The average dairy farmer serving Calgary maintains a herd comprised of approximately 39 animals on a farm 505 acres in size whereas his counterpart in the Edmonton milkshed has a smaller enterprise measuring 439 acres with 34 dairy cows.¹⁶ It may be argued that there is no real difference in farm size because long term yields are larger per acre in the vicinity of Edmonton than those obtained near Calgary. Two indices substantiate this claim: long term yields of feed crops and the cost per acre of farmland. For example, the thirty-five year average oat yield per acre is 37.2 bushels near Edmonton and 35.1 bushels reported for Calgary farms.¹⁷ This difference appears negligible unless it is also realized that 50 per cent of the Calgary production was grown on land which was in summer fallow whereas only 37 per cent of the land used for oats near Edmonton was rotated this way.¹⁸

16. Pers. comm., B. J. McBain, op.cit.

17. Alberta. Dept. of Agriculture, Agricultural Extension Service, Acreage Yields and Production of Wheat, Oats and Barley by Census Divisions, 1921-1926, Edmonton, 1959.

18. Pers. comm., R. E. English, Agricultural Statistician, Alberta.

G. H. Craig discovered, in 1936, that land was evaluated much higher in the Edmonton milkshed than in the vicinity of Calgary.¹⁹ More recent data pertaining to these two areas appear to substantiate this finding.²⁰ The Calgary dairy farmer still manages however, to achieve higher yields of milk per acre of land in farms in spite of its lower crop bearing potential (see Table XXI.). This is achieved in part, by purchasing roughages

TABLE XXI Some Characteristics of Dairy Farms in
Two Milksheds

	Edmonton	Calgary
Land Use in Acres		
Cash crop	19	19
Hay crop	270	260
Rotation Pasture	53	61
Permanent Pasture	78	147
Nonproductive	17	17
Total farm size	437	504
Average herd size	34 .	39 .
Total Milk Production in Pounds per Day	690	825
Milk Production in Pounds per Acre per Day	1.57	1.63

Source: Pers. comm., B. J. McBain, Supervisor, Farm Cost Studies,
Farm Economics Branch, Dept. of Agriculture, Alberta.

19. G. H. Craig, op.cit., p. 402.

20. Pers. comm., B. J. McBain, op.cit.

and feed concentrates which have been grown on irrigated farms farther south.²¹ This practise is reflected in production costs per hundred weight of milk which are higher than in the Edmonton milkshed.²²

Land use is strikingly similar for farms in each milkshed. The only major difference appears to be the percentage of the farm used as permanent pasture. This may be additional evidence that dairying generally takes place on rough land in the Calgary milkshed especially to the west and north of the city.

It is difficult to explain why dairy farms in the vicinity of Calgary are larger both in area and productivity than those near Edmonton. One reason that has been suggested is that the introduction of bulk milk tanks in 1959 helped to eliminate smaller milk producers because they were unable or unwilling to invest additional capital into what already may have been a marginal operation. This may partially explain the rapid increase in the size of dairy enterprises near Calgary after 1960, but it is unsatisfactory for the ten year period prior to this when dairy herds were decidedly larger in the Calgary milkshed than those supplying milk to Edmonton. In all probability there were other factors which have encouraged the elimination of dairy businesses with low milk production.

Many of the differences in size and shape of the two

21. B. J. McBain, Dairy Farm Business Summary, Edmonton, 1961, p. 7.

22. B. J. McBain, loc.cit., p. 1.

major urban milksheds are already apparent but these may be reviewed and discussed in a brief summary. One of the most obvious differences is the degree of attenuation. The Calgary milkshed extends along numerous major highways and encompasses distant areas in which dairying takes place under diverse conditions. Tank trucks often pass through districts in which no milk is produced while en route to more distant dairy farms. Most of the evidence suggests that Calgary's milkshed is rambling and extensive because the city is situated in an area unsuitable for dairying. Recent developments in the Calgary milkshed appear to substantiate this observation. Milk processors are now engaging shippers as far north on Highway 2 as Lacombe. It is too early to suggest that this area will supply a major proportion of Calgary's future milk needs but officials in the dairy industry, when interviewed did not discount this possibility. The reduction in transportation rates experienced with the introduction of bulk handling and shipping facilities allow processors to range this far afield in search of raw materials with no significant increase in cost.

The Edmonton milkshed also seems to be expanding into the same general area but 40 miles farther north of Lacombe in the Hay Lakes district. It is likely that processors in Edmonton will experience increasing competition in this area from their rivals in Wetaskiwin and Camrose. If this results in increased prices for farms then the Cooking Lake moraine physiographic unit immediately east of the city may become a suitable al-

ternative to the Hay Lakes district for future expansion. Presently land plus tree clearing costs are higher on this part of the moraine than the cost of cleared land farther south.²³ However, farmers are slowly improving their holdings in the moraine area just east of Edmonton and are beginning to ship increasing amounts of cream to local creameries. If given the opportunity it is highly likely that they would be most willing to become fluid milk shippers.

23. Pers. comm., B. J. McBain, op.cit.

CHAPTER VI

CONCLUSIONS

Dairying has never been extremely important in Alberta in terms of the percentage of the total gross farm income directly derived from it, nor is it becoming any more important, in a relative sense, even though urban markets have expanded noticeably since the second world war. Regionally, however, dairying plays an important part in the rural economy. In some instances, it appears to be a way in which poor land, or unimproved land if the area in question is in an early stage of development, may be used agriculturally. In other cases, it is a highly commercial form of agriculture in which milk for human consumption is produced for nearby urban markets.

An examination of the distribution of dairying revealed that there is a relationship between this industry and the distribution of the major soil groups. These major soil zones often reflect other physical variables, such as variations in local climatic patterns and surface configurations. In many cases these factors in turn induce individual farmers to consider dairying as a means by which they can best utilize their physical resources. For example, the soils of the black soil zone are extremely fertile and mixed farming, in which dairying plays an important role, has been a feature of this area since its initial settlement. Dairying continues to be most important here in terms of the volume of milk produced although it may have

been expected, before the execution of this study, that this distinction belonged to the grey wooded soil zone. This latter zone is not well suited to the long term production of cash crops because soils here are generally infertile, but dairying has failed to develop appreciably because farming generally has not advanced. Dairying will likely increase in significance as the agricultural economy of this area develops. Even now dairying plays an important part in the local economy but only cream sales are important commercially because fluid milk markets are distant. Dairying was more important in the south in the early history of settlement when most farmers attempted to be self sufficient in many agricultural commodities. Milk production has since declined because of the loss of milk producers and of local markets during the economic depression of the 1930's and later because farming became highly commercial after the second world war. Under these conditions the majority of the farmers in southern Alberta have become increasingly specialized and now produce crops which are best suited to the brown soils in this sub-humid region.

Not only does the importance of dairying vary from place to place in Alberta but there are areal differences in the character of dairying. Farmers who dairy in southern Alberta are generally not interested in dairying as a commercial venture in itself. Large proportions of their rather small output of milk are retained for farm use. The most important directly commercial aspect of their operation is the sale of

cream although this generalization is by no means correct for farmers in the irrigation districts. Southern milk producers are emulated to a large degree by their counterparts in the Peace River district and in the northern parts of the grey wooded soil zone.. But closer to the black soil zone, where the farming districts are older, more intensively farmed, and nearer to the major population concentrations of Alberta, sales of milk and cream are much more important.

Dairy farming in both the grey and brown soil regions can be described as marginal in terms of the amount of milk produced and the percentage of the total farm income derived from it. But if the commercial aspects of dairying are examined alone then both of these areas are noted for the production of cream for butter.

The character of dairying is different on the black soils of the central and northern parts of Alberta. Sales of dairy products are much more important in both an absolute and relative sense. It is here that a large proportion of the commercial dairy farms are located. Market opportunities are excellent, not because large masses of people live here by sheer chance alone, but, because this area possesses some of the most fertile soils in Canada which in turn have made intensive farming with its attendant service centres possible. Dairying is an important part of a mixed farm economy in much of the area, with some noticeable exceptions, such as the grain district surrounding the town of Calmar, but it reaches its

apex in urban milksheds, such as those surrounding Calgary and Edmonton. All of the indices pertaining to milk production indicate that milksheds are the most important dairying areas in all of Alberta.

Economic and provincial legislation have been important factors in the location of dairying in the milksheds. Transportation, for example, has always been an important consideration in the location of fluid milk production because milk is a bulky and highly perishable commodity. But reduction in transportation rates and a loosening of areal controls may have a profound effect on the future location of this type of dairying. Dairy officials suggest that southern irrigation districts have the potential to one day provide all of Alberta's milk needs. Increased bulk handling facilities and improved highways make this technically feasible but, if the shift in Calgary's milkshed can be used as a guide to indicate future trends then dairymen in central Alberta will likely satisfy a large proportion of the milk needs of the people of this province. Specialization trends provide additional evidence for this assumption. Numbers of cows per acre of farm land, quality of breeding, yields per cow and the proportion of income derived from this enterprise all suggest that this area has been noted for dairying throughout the history of the province and that it is presently in an advanced stage of development.

In conclusion it should perhaps be re-emphasized that the purpose of this study was to survey the distribution of dairying

in Alberta. How well it has succeeded is by now evident. But in the course of the survey a number of intriguing problems became apparent: did mixed farming on the prairies pass through a sequence of stages in which dairying initially played an important role, no matter where the original settlement took place or was dairy farming in this period a reflection of other factors, such as the origin of the settler? Is dairying still a way in which unimproved land in newly settled areas can be utilized prior to the development of a more lucrative agricultural specialization which is best suited to the particular conditions in the region? Will dairying continue to decline in southern Alberta or does the rise in milk production in 1961, as reported in the 1961 census of Canada, herald a renewed interest in dairying in the irrigation districts in Alberta?

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